

RECEIVED

APR - 2 2008

ERS DIVISION

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1300 W. Canal Street Milwaukee, WI 53233 414-643-4200 Fax: 414-643-4210

MEMORANDUM

To: 9	Shown Wentel- Dept. of Commerce
From:	Shawn Wenzel- Dept. of Connerce Dale Armbruster
Cc:	
Project	Number:
Date:	4-1-08
	Home Oil

Pls, see attached site into. Y call me W/any questions.

The Sale

								Table 2	2							
							0 2	Soft Quality Results	Results							
								TO FOL	=							
							Σ	Mulowonago, Wisconam	Visconam							
Boring ID	-															
Don't 16			GP-1			GP-7										
(Seet pas)		0-2,	9-8-	24-26'	2.4	10,45	100		200			GP 4			GP-5	
Lead	ma/ka	50	1,7			14-10	.82-92	3-6,	.6-9	22-24	0-3	9-12	120.00	100	3	
Diesel Range Omerica	2	33	<u>;</u>	5.5	11	9.3	-	21	0.4	9			+7-77	5-0	10-12'	24-26'
Signal Varide Organics	mg/kg	25,900	7.1	18,400	12	og G	10,		t.	٥	28	9.1	6.8	13	9.3	Ş
Gasoline Range Organics	ma/ka	3.490	787	2000		8	1,0/0	1,200	34	e.0	33	878	7	36		2
Petroleum Volatile O.	6	_	¥:57	2,880	<5.9	တ္တ	37	230	<53	0 97			332	200	<5.8	<5.9
Compounds:	spunodwa								9:5	0.0	834	8,310	92	80	<5.8	6 2 2 3
Benzene	ua/ka	3.720	707	400												
1 2. Dichloroothan			17	400	9 V	~ 58	09>	40	400	5						
of the control of the	ug/kg	<1,350	<27	<1.400	230	200	9		17	2	5	<289	<29	<28	<29	200
Ethylbenzene	ug/kg	4.060	207	4 400	3 5	37	000	30	<27	<30	8	<289	600	402	1	3
Methyl Tert Butyl Ether	ua/ka	<1350	12	201	3	80	8	110	<27	×30	5	<289	8	3	200	673
Toluene	, , ,		17,	304	230	<28	09>	47	<27	230	157	000		07/	S)	652
124 Trimoth th	ug/kg	3,160	<27	<1,400	<30	<28	-en	ç	12,		?	6875	<29	<28	<29	<29
.,c,+-11111eulyiDenzene	ug/kg	33,800	<27	34.600	089	967		3	/2/	230	Š	<289	<29	37	<29	600
1,3,5-Trimethylbenzene	ug/kg	5,640	<27	2 880	3 6	077	700	3,990	36	<30	8	<289	¢29	S	5	3
Xylenes	10/60	42 500		0,000	3	875	¢60	1,810	<27	<30	33	2380	Ę	3	27	Ş
	Rujaa	13,300	\?\ \?\	3,230	<42	65 39	484	798	737	1		503	£37	44	<29	4 59
Polyaromatic Hydrogashens.								3	107	745	48	404	×40	13.5	141	333

Cleanup Levels NR 720 Soil

100 100

2,900

5.5 9. 1,500

	ì	0.0	``	200	ر د د							200	777	÷	200	,	
Xylenes				000,0	?	428	09×	1,810	<27	Q\$>	127	3		3	57	673	**
	0g/kg	13,500	<37	3,230	<42	<39	<84	100		3	?	6975	<29	44	<29	<29	**
Polyaromatic Hydrocarbons:							5	087	è	<42	48	<404	<40	135	147	<41	4.400
																	Interim Guidance
Acenaphthene	ua/ka	<1.100	/87	000													Cleanup Levels for
Acenaphthylene	6	200	5	, 28U	<59	<55	o9>	96	<53	-e60	Z420	000,		İ			PAHs
An+hrocon	ng/kg	006,15	\$91	<980	×100	<94	<100	4100	٤		7,120	067	<280	<110	<58	6 9>	38,000
a contraction of the contraction	ug/kg	<110	<5.4	334	<5.9	\S.F.	9	3 8	26	300	<200	<490	<480	<190	85	×100	1,000
Benzo (a) Anthracene	ug/kg	1,120	<5.4	<58	65.0	200	0.0	3	65.3	¢6.0	<12	127	37	=	A5.8	O W	000,000
Benzo (b) Fluoranthene	ug/kg	147	<5.4	658	200		0.0	130	<5.3	<6.0	65	<29	428	12	9 4	2	3,000,000
Benzo (k) Fluoranthene	na/ka	787	1	3	8.00	55.5	<6.0	<6.0	<5.3	<6.0	32	530	95,	-	0,7	6.05	17,000
Benzo (a) Pyrene	Du So	707	40.0	<58	<5.9	<5.5	<6.0	<6.0	<5.3	0 47	,	67	270	16	<5.8	<5.9	360,000
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ug/kg	327	<5.4	<58	<5.9	\$55	0 90	9		0.0	67	<29	<28	16	<5.8	<5.9	870.000
Denzo (ghi) Perylene	ug/kg	225	<5.4	<58	0 4/	2	2	2.00	<5.3	<6.0	47	<29	<28	37	8 47	76.0	000'0 10
Chrysene	UJ/ku	180	, 4	3	6.7	C.0.5	0.9>	<6.0	<5.3	<6.0	29	620	00/		0,0	6.00	48,000
Dibenzola hlanthracene	B. B.	201	4.0	228	<5.9	<5.5	<6.0	<6.0	<5.3	680	,		07/	SS	<5.8	<5.9	6,800,000
91000	ng/kg	<220	<11	<120	<12	<11	<12	133		2	07	67.5	<28	56	<5.8	<5.9	37 000
ruoranthene	ug/kg	981	<11	1.840	<12	611	1 5	71,		<12	\$	09>	<55	<22	<12	c12	30,000
Fluorene	ug/kg	2,930	41	1 060	1		715	133	15	<12	110	254	9	236	152	1 5	00,00
Indeno (1, 2, 3-cd) Pyrene	no/ko	63	75.4	200	717	-	<12	157	50	<12	<24	1 120	173	250	71	71.	200,000
1-Methylnaphthalene	2//01	70	*:	33	<5.9	<5.5	<6.0	<6.0	<5.3	990	37	2 6	7/2	77	212	<12	100,000
2-Methylpaphthatono	Su/Sp	0805	32	28,800	38	88	<36	1.570	33	36,	5 8	67.	87	24	<5.8	<5.9	680,000
Nachthalan	ng/kg	<560	427	25,300	30	<28	650	1 840	150	2	8	8,660	872	55	<35	<35	23.000
all significant of the significa	ug/kg	1,580	<32	5,760	<36 <36	<33	367	2 4	7	350	171	<140	<140	112	429	000	000.00
rnenanthrene	ug/kg	2,140	<5.4	5.070	0 4	3	3	653	<32	<36	92	<180	<170	87	235	7	000,02
Pyrene	ua/ka	081	7 3/	277	2	6.0	<6.0	218	18	<6.0	43	658	126	1 2 7		3	400
KEY:			*:0/	061,1	<5.9	<5.5	<6.0	110	6.4	0 99	24		3	-	8.0	<5.9	1,800
•										2.5	5	439	149	97	<5.8	<5.9	8.700.000
47	T KINA A I																22.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2

= Not Analyzed

 ■ Detected = Detected Above NR 720 Soil Cleanup Guidelines or Residual Contaminant Levels or Interim Guidance PAH Cleanup Levels for Groundwater Pathways
 ■ No Standard Established NA BOLD

8,700,000

								Ö Fog	Soil Quality Results	<u>.</u>							
								Mukwon	Mukwonado Wiennen								
Boring ID			4.00														
Depth (feet bgs)		.0.0	5 4	1000		25	1	GP-8	ত	GP-9	Ö	GP-10		17			
Lead	mo/ka	300	3 ;	87-07	0-2	24.	0-2,	2-4'	0-2,	47	0-2	2.41				GP-12	NR 720 Soll
Diesel Range Organics	S (A)	522	= ;	44.7	Ψ¥	Ϋ́	NA	ΝΑ	Ą	ΑΝ	ΔN	1 5 2	7 5	4	0-2,	2-4'	Cleanup Levels
Gasoline Range Organics	Sub.		?	6 , 5,9	¥	Ā	NA	ΑN	Ϋ́	ΑN	V.V		Ę	¥ Z	Ϋ́	ΑĀ	500
Petroleum Volatito Omenie	By Gill	747	339	<5.9	<6.2	<5.8	8.9	\$ 9 9	- 84 - 1	1	٤	¥.	ΨN	Ϋ́	ΝA	AN	100
Bozzon Voigue Organic Compounds:	empounds:							25	7,7	9.0	83	<6.4	<6.2	<5.1	<6.1	<6.0	100
1.200	ug/kg	<140	^ 54	<29	33.	<29	633	700	,								
1;z-Ulchloroethane	ug/kg	<140	\$ 24	\$25	3	8	3 5	3	5	²³	8	<33	<32	<28	<30	150	0.0
Ethylbenzene	ug/kg	2,750	\$5	\$29	\$ 5	300	3	33	34	<29	<34	<33	<32	<26	300	5 5	0.0
Methyl Tert Butyl Ether	ug/kg	<140	<54	\$20	5	3	3	3	3	<29	3 4	\$33	432	208 8C>	230		B. +
Toluene	ug/kg	3.080	<54	3 00	7	S.	118	33	3	<29	\$\$ \$4	33	33	800	3	7	2,900
1,2,4-Trimethylbenzene	ug/kg	18.700	8	200	5	65 V	88	<33	<31	<29	\$6	<33	88	300	3	5	*
1,3,5-Trimethylbenzene	ua/ka	10 200	3	R. S.	5	<29	95	83	33	65>	434	85	38	3 8	3	5	1,500
Xylenes	ua/ka	39 600	4 4	67,	8	<29	<33	<33	33	<29	338	3 8	8 65	8 8	8	33	**
	2	22,000	2/0	441	<43	<41	88	85	42	144	CAB	3	70,	9,	330	<31	:
Polyaromatic Hydrocarbons:											2	¥#\$	82	<36	<42	<42	4,100
Acenaphthene	in the	330															Interim Guidance
Acenaphthylene	Su Su	7,200	- 2 2	6 29	Ϋ́	۸A	AN	Ϋ́	ΑN	ΔN	V 14						PAHs to
Anthracene	Sy/Sn	460	<93	<100	NA	Ą	Ą	A N	AN	1	5	5	¥.	Ϋ́	AA	AA	38,000
Benzo (a) Anthrocan	ug/kg	<28	<5.5	<5.9	Ą	Ą	¥	AN	<u> </u>	¥ :	₹ :	₹ 2	₹	AA	NA	A'A	1,000
Benzo (h) Eliza	ug/kg	187	<5.5	<5.9	Ä	¥	A N	ΔIV	5 5	¥ :	ď.	₹	¥	Ą	A A	AA	3 000 000
Boxes (b) Fluoranthene	ug/kg	100	<5.5	<5.9	AN	¥	42	<u> </u>	¥ S	₹:	¥	¥ Y	NA	ΑĀ	A A	A.N	17.000
Bears (s) Pilloranthene	ug/kg	54	<5.5	<5.9	Ą	Ž	Δ.	2 2	¥ :	₹ :	¥	¥	ΝΑ	ΑN	A N	A N	360,000
Booto (at a control	ug/kg	28	<5.5	<5.9	Ϋ́	AN	ΔN	VIV	<u> </u>	₹ :	¥	ΑN	¥	AA	¥	¥	870,000
Chrysana	ug/kg	62	<5.5	<5.9	A'A	ΑN	4 X	Q V	¥ < 2	₹ :	¥.	ΨN	ΑA	NA	¥	¥.	48.000
Dibonzo(a b)	ug/kg	28	<5.5	<5.9	Α̈́	¥	₽ V	1		<u> </u>	¥	₹	Ϋ́	¥	A'A	ΑΝ	6 800 000
Flioranthone	ng/kg	<55	<11	<12	¥	¥	AN	£ ₹	<u> </u>	¥ :	¥Z	¥.	ν V	ΑN	A A	ΑN	37.000
Elizabeth de la constant de la const	ug/kg	440	<11	<12	Ą	AN	N N		٤ :	¥	₹	¥	¥	ΑĀ	Ā	Ą	38 000
allaion.	ug/kg	62	<11	<12	AN	ΔN	\$ \sqrt{2}	<u> </u>	<u> </u>	A A	AN	AA	AA	A A	¥.	NA	600,000
nideno (1, z, 3-cd) Pyrene	ug/kg	53	<5.5	<5.9	AN	V V	5 5	¥ :	₹	NA NA	Ą	¥	A N	Α×	AN	ΔN	200,000
I-iWethylnaphthalene	ug/kg	473	33	<35	ΔN	5 5	£ :	Y :	₹	¥	NA	ΑĀ	Ą	ΔX	ΔN		000,000
2-Methylnaphthalene	ug/kg	1,210	<27	¢29	4 2	<u> </u>	¥ :	₹ Z	₹	¥	NA	Ā	A A	ž	AN	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	000'089
Naphthalene	ug/kg	1,320	<33	<35	Z V	5 2	¥Z:	¥ :	₹	Ą	AA	Α̈́	¥ ¥	¥	Ų V	<u> </u>	23,000
Phenanthrene	ug/kg	198	<5.5	629	42	2 2	¥ :	¥.	ΑN	¥	ΑĀ	Ā	¥.	₹ Z	Q Z	£ 5	20,000
ryrene	ug/kg	341	<5.5	<59	V N	5 5	¥ :	¥.	¥	Ϋ́	AA	Ą	A A	4Z	MA	5 5	400
KEY:					5	Y.	¥	¥	¥	ă	¥	¥	ΔN	V V	5 5	£ :	1,800
VI.	4												<u></u>	Y.	AA	Ϋ́	8,700,000

BOLD :

■ Not Analyzed
 ■ Detected Above NR 720 Soil Cleanup Guidelines or Residual Contaminant Levels or Interim Guidance PAH Cleanup Levels for Groundwater Pathways
 ■ No Standard Established

					12	Table 2						
					Soll Qua	Solf Quality Results Hom Oil						1
Boring ID					ğ D	TOTAL MARCHINE						
Depth (feet bgs)		;	MW-1			MW-2			NAW A			
Lead		2-4.	10-12	26-28	4-6	12-14'	26-28'	18.9	40.4		NK /20 Soil	
0.000	mg/kg	NA	NA	NA	ĄN	۷N	V.14		12-14	28-30,	Cleanup Levels	
Diesel Range Organics	mg/kg	84	40.0	28,200	<5.2	7.5	AN I	Ψ _N	AN AN	NA	500	ł
Sasoline Range Organics	mg/kg	189	10	2 820	1.0	6.00	6.05	<5.3	<5.5	<5.6	100	
Petroleum Volatile Organic Compounds	Compounds:			21020	7:05	<5.5	<5.9	<5.3	<5.5	<5.6	100	
Benzene	ug/ka	625	630	0007								
1,2-Dichloroethane	un/ka	00/	000	2288	<26	<28	<30	<27	<28	\$C>	U	
Ethylbenzene	- Sing	675	530	<588	<26	<28	<30	<27	<28	238	3.3	
Methyl Tert Butyl Ether	0100	675	080	1,050	<26	<28	<30	<27	×298	27 25	D. 4	
Toluene	Day/Sin	625	<30	<588	<26	<28	<30	<27	238	075	2,900	
1.2.4-Trimethylhenzene	ug/kg	88	<30	<588	<26	<28	<30	<27	077	875	**	
1.3 5-Trimothython-	ng/kg	767	132	32,900	<26	<28	<30	707	07/	875	1,500	
Xylenen	ug/kg	330	46	8,810	<26	<28	8,0	175	878	<28	***	
Ayle169	ug/kg	130	<42	3.640	<36 <	200	3	/75	<28	<28	**	
Polyaromatic Hydrocarbons:					99	807	<42	<37	<39	<39	4,100	_
Acenaphthene	na/ka	03.					į				Interim Guidance Cleanup	•
Acenanhthylene	R. S.	SC/	092	3,290	<52	<55	<59	<£3	70.0			
Anthracana	ug/kg	<100	<100	<1,500	×88	<94	×100	3 5	600	<56	38,000	
Benzo (a) Anthros	ug/kg	31	<6.0	611	<5.2	<5.5	25.0	6 9	484	<95	1,000	
Berro (b) Filtinacene	ug/kg	62	12	2,320	12	<5.5 5.5	5.5	5.0.3	<5.5	<5.6	3,000,000	
perizo (b) Filloranthene	ug/kg	<5.9	<6.0	×88	<5.2	7.0	B. C.	55.3	<5.5	<5.6	17,000	
Benzo (k) Fluoranthene	ug/kg	<5.9	<6.0	×88	<5.2	0.0	6.5.9	<5.3	<5.5	<5.6	360,000	
Benzo (a) Pyrene	ug/kg	<5.9	<6.0	×88	<5.7	0.00	6.05	<5.3	<5.5	<5.6	870,000	
Benzo (ghi) Perylene	ug/kg	<5.9	<6.0	×88	×5.2	0.00	6.02	<5.3	<5.5	<5.6	48,000	
Chrysene	ug/kg	62	<6.0	635	15	0.07	6.0.9	<5.3	<5.5	<5.6	6,800,000	
Ulbenzo(a,h)anthracene	ug/kg	<12	<12	<180	170	0.07	6.6>	<5.3	<5.5	<5.6	37.000	
Fluoranthene	ug/kg	46	<12	5 200	017		<12	41	<11	<11	38.000	
Fluorene	ug/kg	35	30	2,230	01.	<11	<12	<11	<11	<11	500 000	
Indeno (1, 2, 3-cd) Pyrene	ua/ka	<5.0	0 9/	007,5	01.5	<11	<12	<11	411	×41	100 000	
1-Methylnaphthalene	ug/ko	380	2.00	807	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	000,000	
2-Methylnaphthalene	10//	200	000	005,07	33	<33	<36	<32	<33	633	000,000	
Naphthalene	64/63 64/63	342	839	74,000	<26	<28	<30	<27	\$00 800	300	23,000	
Phenanthrene	ng/kg	011	300	16,500	<31	<33	<36	<32	733	07	20,000	
Pyrene	ng/kg	93	9	10,300	<5.2	<5.5	<5.9	<53	200	433 100	400	
KEV.	ug/kg	100	43	6,230	15	<5.5	65 Q	5,5	0.0	9.02	1,800	
 						2	איני.	r cv		0 4/		

Not Analyzed ¥

= Detected Above NR 720 Soil Cleanup Guidelines or Residual Contaminant Levels or Interim Guidance PAH Cleanup Levels for Gipundwater Pathways = No Standard Established BOLD

8,700,000

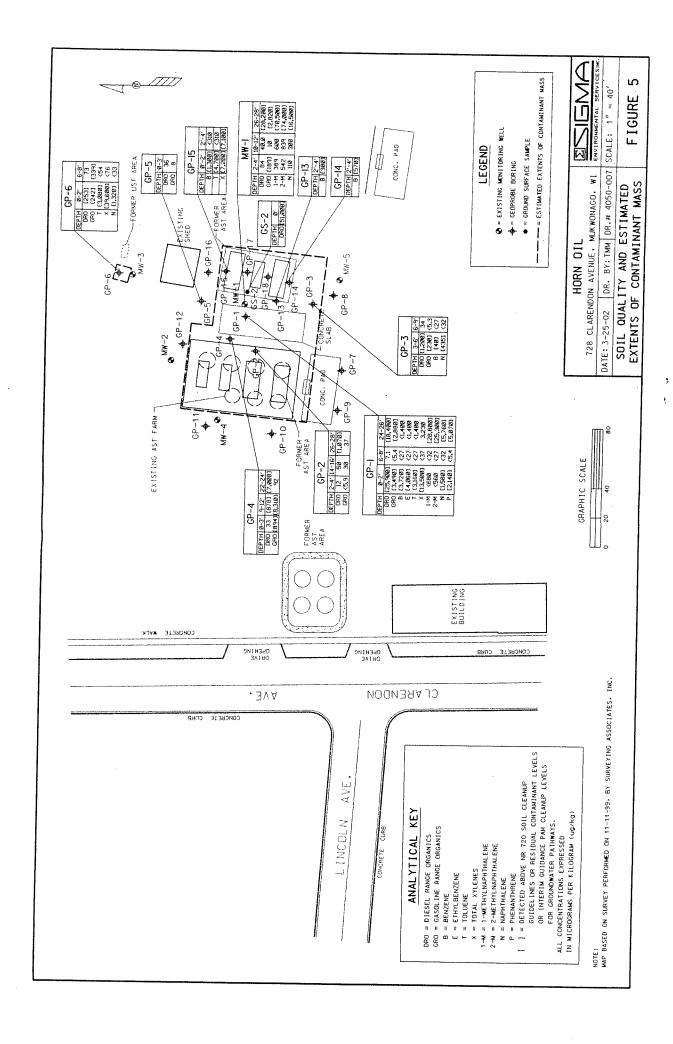
<5.6

<5.5

<32 <5.3 <5.3

*

Sigma Environmental Services, Inc.



Corporate Office & Laboratory 1241 Bellevue Street Green Bay, WI 54302 920-469-2436 • Fax: 920-469-8827 800-7-ENCHEM



Madison Office & Laboratory

525 Science Drive Madison, WI 53711 608-232-3300 • FAX: 608-233-0502 888-5-ENCHEM

- Analytical Report -

Project Name: HORN OIL

Project Number: 4050

WI DNR LAB ID: 405132750

Client: SIGMA ENVIRONMENTAL SERVICES

Sample No.	Field ID	Collection Date	Sample No.	Field ID	Collection
821041-001	GP-13 0'-2'	3/6/02	oumple 140.	Lieid ID	Date
821041-002	GP-13 2'-4'	3/6/02			
821041-003	GP-14 0'-2'	3/6/02			
821041-004	GP-14 2'-4'	3/6/02			
821041-005	GP-15 0'-2'	3/6/02			
821041-006	GP-15 2'-4'	3/6/02			
821041-007	GP-16 0'-4'	3/6/02			
821041-008	GP-16 2'-4'	3/6/02			

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The "Q" flag is present when a parameter has been detected below the LOQ. This indicates the results are qualified due to the uncertainty of the parameter concentration between the LOD and the LOQ.

Soil VOC detects are corrected for the total solids, unless otherwise noted.

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and Laboratory Standard Operating Procedure. Exceptions, if any, are discussed in the accompanying sample comments. Release of this final report is authorized by Laboratory management, as is verified by the following signature. Reported results shall not be reproduced, except in full, without the written approval of the lab. The sample results relate only to the analytes of interest

Approval Signature

Date

03/13/02

Batch No. 8200	En Chem, Ir	nc. Cooler	Receip	t Log	
Project Name or ID 4050		No. of Cooler	s: /	Tem	nps: ROI
A. Receipt Phase: Date cooler was opene	d: 3/7/02		1.	lua	Mely.
1: Were samples received on ice? (Must be	≤6 C)			NO ²	
2. Was there a Temperature Blank?	•	••••	YES	NO/	
3: Were custody seals present and intact? (.© (0)	
4: Are COC documents present?				NO ²	
5: Does this Project require quick turn around				(NO)	
6: Is there any sub-work?			VEQ	(6)	
7: Are there any short hold time tests?				_	·
8: Are any samples nearing expiration of hold				(G)	•
9: Do any samples need to be Filtered or Pres				6	Contacted by/Who
B. Check-in Phase: Date samples were Che	cked-in: 3/7/	07		NO)	Contacted by/Who
1: Were all sample containers listed on the Co	•				· · · · · · · · · · · · · · · · · · ·
2: Sign the COC as received by En Chem. Co				NO ²	NA ·
3: Do sample labels match the COC?		•	(ES)	NO	
4: Check sample pH of preserved samples. (N				NO ²	63
5: Do samples have correct chemical preserva				NO	NA
6: Are dissolved parameters field filtered?				NO ²	NA
7: Are sample volumes adequate for tests requ				NO ²	NA
8: Are VOC samples free of bubbles >6mm				NO ²	
9: Enter samples into logbook. Completed				NO ²	NA
10: Place laboratory sample number on all con-				NO	
11: Complete Laboratory Tracking Sheet (LTS)				NO	<i>a</i>
12: Start Nonconformance form.				NO	NA O
13: Initiate Subcontracting procedure. Complet				NO	(NA)
14: Check laboratory sample number on all con			_	NO	MA
Short Hold-time tests:	canicis and COC	<i>UD_f</i> :	YES)	NO	NA
48 Hours or less 7 day	'S	п	Egotast-		
Coliform (6 hrs) Flash Hexavalent Chromium (24 Hrs) TSS	point		Footnotes 1 Notify p	roper lab c	roup
DAD	Solids		immediate 2 Complet	ely. te noncont	formance memo.

Rev. 9/5/2001, Attachment to 1-REC-5. Subject to QA Audit.

Sulfide

Ash

Free Liquids Total Volatile Solids

Aqueous Extractable Organics- ALL Unpreserved VOC's

Low Level Mercury

Ortho Phosphorus

En Core Preservation

Turbidity Surfactants

Sulfite

Color

Reviewed by/date W 3 N J

En Chem Inc.

1241 Believue Street Green Bay, WI 54302 920-469-2436 800-7-ENCHEM Fax: 920-469-8827

Lab#:	TestGroupID:	Comment:
821041-00 ⁻ GP-13 0'-2'	PVOC+-S-ME	 K - Detection limit may be elevated due to the presence of an unrequested analyte.
	PVOC+-S-ME	& - Samples have analytes qualified with an "&" qualifier because they are associated to a LCS with recoveries outside control limits. The SOP allows a limited number of analytes to be outside the control limits based on the number of analytes spiked.
821041-002 GP-13 2'-4'	PVOC+-S-ME	K - Detection limit may be elevated due to the presence of an unrequested analyte.
	PVOC+-S-ME	& - Samples have analytes qualified with an "&" qualifier because they are associated to a LCS with recoveries outside control limits. The SOP allows a limited number of analytes to be outside the control limits based on the number of analytes spiked.
821041-003 GP-140'-2'	PVOC+-S-ME	& - Samples have analytes qualified with an "&" qualifier because they are associated to a LCS with recoveries outside control limits. The SOP allows a limited number of analytes to be outside the control limits based on the number of analytes spiked.
821041-004 GP-14 2'-4'	PVOC+-S-ME	K - Detection limit may be elevated due to the presence of an unrequested analyte.
	PVOC+-S-ME	& - Samples have analytes qualified with an "&" qualifier because they are associated to a LCS with recoveries outside control limits. The SOP allows a limited number of analytes to be outside the control limits based on the number of analytes spiked.
821041-005 GP-15 0'-2'	PVOC+-S-ME	& - Samples have analytes qualified with an "&" qualifier because they are associated to a LCS with recoveries outside control limits. The SOP allows a limited number of analytes to be outside the control limits based on the number of analytes spiked.
821041-006 GP-15 2'-4'	PVOC+-S-ME	K - Detection limit may be elevated due to the presence of an unrequested analyte.
	PVOC+-S-ME	& - Samples have analytes qualified with an "&" qualifier because they are associated to a LCS with recoveries outside control limits. The SOP allows a limited number of analytes to be outside the control limits based on the number of analytes spiked.
821041-007 GP-16 0'-4'	PVOC+-S-ME	& - Samples have analytes qualified with an "&" qualifier because they are associated to a LCS with recoveries outside control limits. The SOP allows a limited number of analytes to be outside the control limits based on the number of analytes spiked.
821041-008 GP-16 2'-4'	PVOC+-S-ME	& - Samples have analytes qualified with an "&" qualifier because they are associated to a LCS with recoveries outside control limits. The SOP allows a limited number of analytes to be outside the control limits based on the number of analytes spiked.

- Analytical Report -

Project Name: HORN OIL

Project Number: 4050

Field ID: GP-13 0'-2'

Lab Sample Number: 821041-001

WI DNR LAB ID: 405132750

Client: SIGMA ENVIRONMENTAL SERVICES

Report Date: 3/13/02

Collection Date: 3/6/02

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	83.2				%		3/8/02	SM2540G	SM2540G	KEG

PVOC + 1,2-DICHLOROET	HANE -SOIL/METI	HANOL	Prep Met	hod: SV	/846 5030B	Prep Date:	3/8/02	Analyst: JJB
Analyte	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis Method
Benzene	< 250	250	600		ug/kg	V o		
1,2-Dichloroethane	< 250	250	600			K&	3/8/02	SW846 8260B
Ethylbenzene	820				ug/kg	K	3/8/02	SW846 8260B
Methyl-tert-butyl-ether		300	720		ug/kg	K	3/8/02	SW846 8260B
•	< 250	250	600		ug/kg	K	3/8/02	SW846 8260B
oluene	710	300	720		ug/kg	QK	3/8/02	
,3,5-Trimethylbenzene	3100	300	720		ug/kg			SW846 8260B
,2,4-Trimethylbenzene	3800	300				K	3/8/02	SW846 8260B
ylenes, -m, -p	1500		720		ug/kg	κ	3/8/02	SW846 8260B
ylene, -o		300	720		ug/kg	K	3/8/02	SW846 8260B
•	810	300	720		ug/kg	к	3/8/02	
ibromofluoromethane	73				%Recov			SW846 8260B
oluene-d8	73						3/8/02	SW846 8260B
-Bromofluorobenzene	74				%Recov		3/8/02	SW846 8260B
	74				%Recov		3/8/02	SW846 8260B

- Analytical Report -

Project Name: HORN OIL

Project Number: 4050

Field ID: GP-13 2'-4'

Lab Sample Number: 821041-002

WI DNR LAB ID: 405132750

Client: SIGMA ENVIRONMENTAL SERVICES

Report Date: 3/13/02

Collection Date: 3/6/02

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	83.0				%		3/8/02	SM2540G	SM2540G	KEG

PVOC + 1,2-DICHLOROET	THANE -SOIL/MET	HANOL	Prep Met	hod: SV	/846 5030B	Prep Date:	3/8/02	Analyst: JJB
Analyte	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis
Benzene	300	300	720					Method
1,2-Dichloroethane	< 250	250			ug/kg	QK&	3/8/02	SW846 8260B
Ethylbenzene	750		600		ug/kg	K	3/8/02	SW846 8260B
Methyl-tert-butyl-ether		300	720		ug/kg	K	3/8/02	SW846 8260B
Toluene	< 250	250	600		ug/kg	K	3/8/02	SW846 8260B
	< 250	250	600		ug/kg	ĸ	3/8/02	SW846 8260B
1,3,5-Trimethylbenzene	3700	300	720		ug/kg	К	3/8/02	
1,2,4-Trimethylbenzene	7700	300	720		ug/kg	ĸ		SW846 8260B
(ylenes, -m, -p	2000	300	720				3/8/02	SW846 8260B
(ylene, -o	490	300	720		ug/kg -	K	3/8/02	SW846 8260B
Dibromofluoromethane	80	300	720		ug/kg	QK	3/8/02	SW846 8260B
oluene-d8					%Recov		3/8/02	SW846 8260B
-Bromofluorobenzene	78				%Recov		3/8/02	SW846 8260B
- o mondo obenzene	76				%Recov		3/8/02	SW846 8260B

- Analytical Report -

Project Name: HORN OIL

Project Number: 4050

Field ID: GP-14 0'-2'

Lab Sample Number: 821041-003

WI DNR LAB ID: 405132750

Client: SIGMA ENVIRONMENTAL SERVICES

Report Date: 3/13/02

Collection Date: 3/6/02

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	84.7				%		3/8/02	SM2540G	SM2540G	KEG

PVOC + 1,2-DICHLOROETHANE -SOIL/METHANOL			HANOL	Prep Met	hod: SW	/846 5030B	Prep Date:	3/8/02	Analyst: JJB
Analyte	F	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis Method
Benzene	<	25	25	60		ug/kg	&		
1,2-Dichloroethane	<	25	25	60		• •	α	3/8/02	SW846 8260B
Ethylbenzene		160	30	72		ug/kg		3/8/02	SW846 8260B
Methyl-tert-butyl-ether	<	25				ug/kg		3/8/02	SW846 8260B
Toluene	`		25	60		ug/kg		3/8/02	SW846 8260B
		140	30	72		ug/kg		3/8/02	SW846 8260B
1,3,5-Trimethylbenzene		110	30	72		ug/kg		3/8/02	SW846 8260B
1,2,4-Trimethylbenzene		220	30	72		ug/kg		3/8/02	
Xylenes, -m, -p		190	30	72		ug/kg			SW846 8260B
Xylene, -o		120	30	72				3/8/02	SW846 8260B
Dibromofluoromethane		85	00	12		ug/kg		3/8/02	SW846 8260B
Toluene-d8						%Recov		3/8/02	SW846 8260B
4-Bromofluorobenzene		83				%Recov		3/8/02	SW846 8260B
4-Bromondorobenzene		78				%Recov		3/8/02	SW846 8260B

- Analytical Report -

Project Name: HORN OIL

Project Number: 4050

Field ID: GP-14 2'-4'

Lab Sample Number: 821041-004

WI DNR LAB ID: 405132750

Client: SIGMA ENVIRONMENTAL SERVICES

Report Date: 3/13/02

Collection Date: 3/6/02

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	73.6		•		%		3/8/02	SM2540G	SM2540G	KEG

PVOC + 1,2-DICHLOROETHANE -SOIL/METHANOL			Prep Met	hod: SV	/846 5030B	Prep Date:	3/8/02	Analyst: JJB
Analyte	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis Method
Benzene	570	270	650		ug/kg	QK&		
1,2-Dichloroethane	< 200	200	480		- •		3/8/02	SW846 8260B
Ethylbenzene	1300	270			ug/kg	K	3/8/02	SW846 8260B
Methyl-tert-butyl-ether			650		ug/kg	K	3/8/02	SW846 8260B
	< 200	200	480		ug/kg	K	3/8/02	SW846 8260B
Toluene	< 200	200	480		ug/kg	κ	3/8/02	SW846 8260B
1,3,5-Trimethylbenzene	2700	270	650		ug/kg	K		
1,2,4-Trimethylbenzene	12000	270	650				3/8/02	SW846 8260B
Xylenes, -m, -p	1700				ug/kg	K	3/8/02	SW846 8260B
Xylene, -o		270	650		ug/kg	κ	3/8/02	SW846 8260B
	330	270	650		ug/kg	QK	3/8/02	SW846 8260B
Dibromofluoromethane	78				%Recov		3/8/02	
Toluene-d8	66							SW846 8260B
1-Bromofluorobenzene	81				%Recov		3/8/02	SW846 8260B
	01				%Recov		3/8/02	SW846 8260B

- Analytical Report -

Project Name: HORN OIL

Project Number: 4050

Field ID: GP-15 0'-2'

Lab Sample Number: 821041-005

WI DNR LAB ID: 405132750

Client: SIGMA ENVIRONMENTAL SERVICES

Report Date: 3/13/02

Collection Date: 3/6/02

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	79.8				%		3/8/02	SM2540G	SM2540G	KEG

PVOC + 1,2-DICHLOROETHANE -SOIL/METHANOL			Prep Method: SW846 5030B			Prep Date:		Analyst: TLT	
Analyte	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis M ethod	
Benzene	1300	31	74		ug/kg	&			
1,2-Dichloroethane	< 25	25	60				3/12/02	SW846 8260B	
Ethylbenzene	970	31			ug/kg	&	3/12/02	SW846 8260B	
Methyl-tert-butyl-ether	-		74		ug/kg		3/12/02	SW846 8260B	
Toluene	< 25	25	60		ug/kg		3/12/02	SW846 8260B	
	4700	31	74		ug/kg		3/12/02	SW846 8260B	
1,3,5-Trimethylbenzene	2800	31	74		ug/kg		3/12/02		
1,2,4-Trimethylbenzene	2900	31	74		ug/kg			SW846 8260B	
Xylenes, -m, -p	5300	31	74				3/12/02	SW846 8260B	
Xylene, -o	1900	31			ug/kg		3/12/02	SW846 8260B	
Dibromofluoromethane		31	74		ug/kg		3/12/02	SW846 8260B	
Toluene-d8	68				%Recov		3/12/02	SW846 8260B	
	68				%Recov		3/12/02	SW846 8260B	
1-Bromofluorobenzene	65				%Recov		3/12/02	SW846 8260B	

En Chem Inc.

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- Analytical Report -

Project Name: HORN OIL

Project Number: 4050

Field ID: GP-15 2'-4'

Lab Sample Number: 821041-006

WI DNR LAB ID: 405132750

Client: SIGMA ENVIRONMENTAL SERVICES

Report Date: 3/13/02

Collection Date: 3/6/02

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	84.7				%		3/8/02	SM2540G	SM2540G	KEG

PVOC + 1,2-DICHLOROETHANE -SOIL/METHANOL			Prep Met	hod: SV	/846 5030B	Prep Date:	: 3/8/02	Analyst: JJB
Analyte	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis M ethod
Benzene	< 310	310	740		ug/kg			
1,2-Dichloroethane	< 310	310	740		• •	K&	3/8/02	SW846 8260B
Ethylbenzene	1300		_		ug/kg	K	3/8/02	SW846 8260B
Methyl-tert-butyl-ether		370	890		ug/kg	K	3/8/02	SW846 8260B
Foluene	< 310	310	740		ug/kg	κ	3/8/02	SW846 8260B
	< 310	310	740		ug/kg	К	3/8/02	SW846 8260B
1,3,5-Trimethylbenzene	5300	370	890		ug/kg	K	3/8/02	
,2,4-Trimethylbenzene	12000	370	890		ug/kg			SW846 8260B
(ylenes, -m, -p	6700	370	890			K	3/8/02	SW846 8260B
(vlene, -o	400				ug/kg	K	3/8/02	SW846 8260B
Dibromofluoromethane		370	890		ug/kg	QK	3/8/02	SW846 8260B
	80				%Recov		3/8/02	SW846 8260B
oluene-d8	89				%Recov		3/8/02	·· -
l-Bromofluorobenzene	98				%Recov			SW846 8260B
					MECOA		3/8/02	SW846 8260B

- Analytical Report -

Project Name: HORN OIL

Project Number: 4050

Field ID: GP-16 0'-4'

Lab Sample Number: 821041-007

WI DNR LAB ID: 405132750

Client: SIGMA ENVIRONMENTAL SERVICES

Report Date: 3/13/02

Collection Date: 3/6/02

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	91.1				%		3/8/02	SM2540G	SM2540G	KEG

PVOC + 1,2-DICHLOROETHANE -SOIL/METHANOL			Prep Met	hod: SV	V846 5030B	Prep Date:	3/8/02	Analyst: . JJB	
Analyte	I	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis Method
Benzene	<	25	25	60	***************************************	ug/kg	&	3/8/02	
1,2-Dichloroethane	<	25	25	60		ug/kg	ű		SW846 8260B
Ethylbenzene		53	27	65			•	3/8/02	SW846 8260B
Methyl-tert-butyl-ether	<	25	25			ug/kg	Q	3/8/02	SW846 8260B
Toluene				60		ug/kg		3/8/02	SW846 8260B
		99	27	65		ug/kg		3/8/02	SW846 8260B
1,3,5-Trimethylbenzene		41	27	65		ug/kg	Q	3/8/02	SW846 8260B
1,2,4-Trimethylbenzene		95	27	65		ug/kg		3/8/02	
Xylenes, -m, -p		140	27	65		~ ~			SW846 8260B
Xylene, -o		64	27			ug/kg		3/8/02	SW846 8260B
Dibromofluoromethane			21	65		ug/kg	Q	3/8/02	SW846 8260B
		88				%Recov		3/8/02	SW846 8260B
Toluene-d8		86				%Recov		3/8/02	SW846 8260B
4-Bromofluorobenzene		81				%Recov			
						/01/GCOA		3/8/02	SW846 8260B

- Analytical Report -

Project Name: HORN OIL

Project Number: 4050

Client: SIGMA ENVIRONMENTAL SERVICES

Field ID: GP-16 2'-4'

Report Date: 3/13/02

Lab Sample Number: 821041-008

Collection Date: 3/6/02

WI DNR LAB ID: 405132750

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	86.7				%		3/8/02	SM2540G	SM2540G	KEG

PVOC + 1,2-DICHLOROETHANE -SOIL/METHANOL			Prep Met	hod: SW	/846 5030B	Prep Date:	3/8/02	Analyst: JJB	
Analyte	1	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis Method
Benzene	<	25	25	60		ug/kg	&	3/8/02	
1,2-Dichloroethane	<	25	25	60		ug/kg	•	3/8/02	SW846 8260B
Ethylbenzene	<	25	25	60		ug/kg			SW846 8260B
Methyl-tert-butyl-ether	<	25	25	60				3/8/02	SW846 8260B
Toluene	<	25	25	60		ug/kg		3/8/02	SW846 8260B
1,3,5-Trimethylbenzene	<	25	25			ug/kg 		3/8/02	SW846 8260B
1,2,4-Trimethylbenzene	<	25		60		ug/kg		3/8/02	SW846 8260B
Xylenes, -m, -p			25	60		ug/kg		3/8/02	SW846 8260B
• • • •	<	25	25	60		ug/kg		3/8/02	SW846 8260B
Xylene, -o	<	25	25	60		ug/kg		3/8/02	SW846 8260B
Dibromofluoromethane		78				%Recov		3/8/02	SW846 8260B
Toluene-d8		77				%Recov			
1-Bromofluorobenzene		78						3/8/02	SW846 8260B
		70				%Recov		3/8/02	SW846 8260B

(Please Print Legibly)	Sign		3				<u>.</u>		
Branch or Location:	Oak Ocek Wi		田田	9~1	CHEM	1241 Bellevue St., Suite 9 Green Bay, WI 54302 920-469-2436	525 Science Drive Madison, WI 53711 608-232-3300	•	
Project Contact:	Tale Armbouster				INC.	FAX 920-469-8827	FAX: 608-233-0502	35 >	
Telephone: (4/14)	768-7144		S	CHAIL	V OF	CUSTODY	CD 55.	Page / of /	
Project Number:	4050				A=None B=HCl C=H2SC	*Preservation Codes		P.O. # Quote #	
Project Name: Ho	Horn Oil				H = Sodium Bisultate Solution FILTERED? (YES/NO)	1 = Sodium Thiosulfate 3 =	Other GanaGH	aport To	
Project State:);,		g.	ESERV	PRESERVATION (CODE)*			pany: Sister a	
Sampled By (Print):	Dale Armbruster				8		No.	A (
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Sample Results Only (no QC) EPA Level II (Subject to Surcharge) EPA Level III (Subject to Surcharge) EPA Level III (Subject to Surcharge)	y (no QC) xt to Surcharge) ct to Surcharge) ct to Surcharge)	UST RCRA SDWA NPDES CERCLA	W=Water S=Soil A=Air C=Charcoal B=Biota		A STATE OF THE PARTY OF THE PAR		Company: Address:		
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(Lab Use Only)	FIELD 1D	DATE TIM	TION MATRIX	2		/\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	CLIENT COMMENTS	LAB COMMENTS	
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00%	5P-13 2'-4'	3.50	~	>	>	1		11 20x 1 20h	
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Rush Turnaround Time Requested (TAT Rush TAT subject to approval/surcharge)	Aush Turnaround Time Requested (TAT) - Prelim Flush TAT subject to approval/surcharge)	Relinguished By:	1	D	Date/Time:	Repetred BY:	3/2/LD Date/Time:	En Cham Project No.	
Date Needed:	Sults by (circle):	Relinguished B	1		3/ Date/Time:	Received By/	Date/Tim	Sample Receipt Temp.	
Phone Fax	E-Mail	Relinquished By:	V. Lee		7/62 15 4 Date/Time:	Received By:	Miller 37	1000 9	
none #:		_			•		Cate 1 116.	(Wednesday)	
-Mail Address:		Relinquished By:	: ,		Date/Time:	Received By:	Date/Time:	Cooler Gustody Seal	
Samples on special pricing	Samples on HOLD are subject to special pricing and release of liability	Relinquished By:	ły:		Date/Time:	Received By:	Date/Time:	Present / Not Present	
								Version 2.0: 1/02	

Corporate Office & Laboratory 1241 Bellevue Street Green Bay, WI 54302 920-469-2436 • Fax: 920-469-8827 800-7-ENCHEM



Madison Office & Laboratory

525 Science Drive Madison, WI 53711 608-232-3300 • Fax: 608-233-0502 888-5-ENCHEM

- Analytical Report -

Project Name: HORN OIL

Project Number: #4050

WI DNR LAB ID: 405132750

Client: SIGMA ENVIRONMENTAL SERVICES

Sample No.	Field ID	Collection Date	Sample No.	Field ID	Collection Date
822178-001	GP-17 0-2	5/1/02			
822178-002	GP-17 2-4	5/1/02			
822178-003	GP-18 0-2	5/1/02			
822178-004	GP-18 2-4	5/1/02			

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The "Q" flag is present when a parameter has been detected below the LOQ. This indicates the results are qualified due to the uncertainty of the parameter concentration between the LOD and the LOQ.

Soil VOC detects are corrected for the total solids, unless otherwise noted.

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and Laboratory Standard Operating Procedure. Exceptions, if any, are discussed in the accompanying sample comments. Release of this final report is authorized by Laboratory management, as is verified by the following signature. Reported results shall not be reproduced, except in full, without the written approval of the lab. The sample results relate only to the analytes of interest tested.

Approval Signatur

Date

Batch No - €27/78	En Chem, I	inc. Cooler R	eceipt	Log		
Project Name or ID HOLN O	L 44050	No. of Coolers:		Tem	ips:	
A. Receipt Phase: Date cooler w	/as opened: 5-1- az	By:	<i>_/</i> /		·	
1: Were samples received on ice?				NO ²		
2. Was there a Temperature Blank	?		YES	(NO)		
3: Were custody seals present and	d'intact? (Record on COC)		YES	(ND)		
4: Are COC documents present?			.YES	NO ²		
5: Does this Project require quick t	turn around analysis?	***************************************	YES	KO		
6: Is there any sub-work?	*	••••••	YES	KO		
7: Are there any short hold time tes	sts?	••••••	YES	NO		•
8: Are any samples nearing expirat	tion of hold-time? (Within 2 days).	······································	YES1	NO	Contacted by/Who	
9: Do any samples need to be Filte				NO	Contacted by/Who	
B. Check-in Phase: Date samples						
1: Were all sample containers lister		`		NO ²	NA '	
2: Sign the COC as received by En		`		NO		
3: Do sample labels match the CO				NO ²		
4: Check sample pH of preserved s				NO	(M)	
5: Do samples have correct chemic			_	NO ²	NA	
6: Are dissolved parameters field fil				NO ²	NA	
7: Are sample volumes adequate fo			_	NO ²		
8: Are VOC samples free of bubbles				NO ²	N	
9: Enter samples into logbook. Com		•		NO		
10: Place laboratory sample numbe			-	NO		
11: Complete Laboratory Tracking S				NO.		
12: Start Nonconformance form				NO	(NA)	
13: Initiate Subcontracting procedure		/ /	YES	NO	NAO	
14: Check laboratory sample numbe	er on all containers and COC	. <u>c/ // 02</u> (YES	NO	NA:	
Short Hold-time tests:						
48 Hours or less Coliform (6 hrs)	7 days Flashpoint		Footnotes			
Hexavalent Chromium (24 Hrs)	TSS		1. Notify pr		group	
BOD	Total Solids		immediate		nfo-man-a	
Nitrite or Nitrate	TDS	1	- Complet	ie iioucoi	nformance memo.	
Low Level Mercury	Sulfide	-			·	
Ortho Phosphorus	Free Liquids					
Turbidity	Total Volatile Solids					

Rev. 9/5/2001, Attachment to 1-REC-5. Subject to QA Audit.

Surfactants Sulfite

Color

En Core Preservation

Ash

Total Volatile Solids
Aqueous Extractable Organics- ALL
Unpreserved VOC's

Reviewed by/gate w5/2/x

Organic Data Qualifiers

В	Analyte is present in the method blank. Method blank criteria is evaluated to the laboratory method detection limit. Additionally, method blank acceptance may be based on project specific criteria or determined from analyte concentrations in the sample and are evaluated on a sample by sample basis.
С	Elevated detection limit.
D	Analyte value from diluted analysis, or surrogate result not applicable due to sample dilution.
E	Analyte concentration exceeds calibration range.
F	Surrogate results outside control criteria.
Н	Extraction or analysis performed past holding time.
`J	Qualitative evidence of analyte present: concentration detected is greater than the method detection limit but less than the reporting limit.
K	Detection limit may be elevated due to the presence of an unrequested analyte.
N	Spiked sample recovery not within control limits.
Р	The relative percent difference between the two columns for detected concentrations was greater than 40%.
Q	The analyte has been detected between the limit of detection (LOD) and limit of quantitation (LOQ). The results are qualified due to the uncertainty of analyte concentrations within this range.
S	The relative percent difference between quantitation and confirmation columns exceeds internal quality control criteria. Because the result is unconfirmed, it has been reported as a non-detect with an elevated detection limit.
U .	The analyte was not detected above the reporting limit.
W	Sample received with headspace.
X	See Sample Narrative.
&	Laboratory Control Spike recovery not within control limits.
•	Duplicate analyses not within control limits.
SUB1	Assay was subcontracted to an approved lab.
SUB2	Assay was subcontracted to En Chem Green Bay WI Cert. #405132750.

En Chem Inc.

1241 Believue Street Green Bay, WI 54302 920-469-2436 800-7-ENCHEM Fax: 920-469-8827

- Analytical Report -

Project Name: HORN OIL

Project Number: #4050

Client: SIGMA ENVIRONMENTAL SERVICES

Field ID: GP-17 0-2

Report Date: 5/7/02

Lab Sample Number: 822178-001

Collection Date: 5/1/02

WI DNR LAB ID: 405132750

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	76.0				%		5/1/02	SM 2540G M	SM 2540G M	KEG

PVOC + 1,2-DICHLOROE	THANE -	SOIL/MET	HANOL .	Prep Method:		/846 5030B	Prep Date:	5/3/02	Analyst: TLT
Analyte	F	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis Method
Benzene		120	33	79		ug/kg		5/3/02	SW846 8260B
1,2-Dichloroethane	<	25	25	60		ug/kg	&	5/3/02	SW846 8260B
Ethylbenzene		140	33	79		ug/kg		5/3/02	SW846 8260B
Methyl-tert-butyl-ether	<	25	25	60		ug/kg		5/3/02	SW846 8260B
Toluene		130	33	79		ug/kg		5/3/02	SW846 8260B
1,3,5-Trimethylbenzene		950	33	79		ug/kg		5/3/02	SW846 8260B
1,2,4-Trimethylbenzene		2800	33	79		ug/kg		5/3/02	SW846 8260B
Xylenes, -m, -p		370	33	79		ug/kg		5/3/02	SW846 8260B
Xylene, -o	<	25	25	60		ug/kg		5/3/02	SW846 8260B
Dibromofluoromethane		84				%Recov		5/3/02	SW846 8260B
Toluene-d8		90				%Recov		5/3/02	SW846 8260B
4-Bromofluorobenzene		92				%Recov		5/3/02	SW846 8260B

- Analytical Report -

Project Name: HORN OIL

Project Number: #4050

Lab Sample Number: 822178-002

Field ID: GP-17 2-4

Report Date: 5/7/02

Client: SIGMA ENVIRONMENTAL SERVICES

Collection Date: 5/1/02

Matrix Type: SOIL

WI DNR LAB ID: 405132750

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	84.8				%		5/1/02	SM 2540G M	SM 2540G M	KEG

PVOC + 1,2-DICHLOROET	HANE -	SOIL/METH	HANOL	Prep Method: SW846 5030B			Prep Date:	5/3/02	Analyst: TLT
Analyte	ı	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis Method
Benzene	<	130	130	310		ug/kg	K	5/3/02	SW846 8260B
1,2-Dichloroethane	<	130	130	310		ug/kg	K&	5/3/02	SW846 8260B
Ethylbenzene	<	130	130	310		ug/kg	K	5/3/02	SW846 8260B
Methyl-tert-butyl-ether	<	130	130	310		ug/kg	К	5/3/02	SW846 8260B
Toluene	<	130	130	310		ug/kg	κ	5/3/02	SW846 8260B
1,3,5-Trimethylbenzene		1600	150	360		ug/kg	К	5/3/02	SW846 8260B
1,2,4-Trimethylbenzene		4200	150	360		ug/kg	К	5/3/02	SW846 8260B
Xylenes, -m, -p	<	130	130	310		ug/kg	K	5/3/02	SW846 8260B
Xylene, -o	<	130	130	310		ug/kg	К	5/3/02	SW846 8260B
Dibromofluoromethane		90				%Recov		5/3/02	SW846 8260B
Toluene-d8		94				%Recov		5/3/02	SW846 8260B
4-Bromofluorobenzene		99				%Recov		5/3/02	SW846 8260B

En Chem Inc.

1241 Believue Street Green Bay, WI 54302 920-469-2436 800-7-ENCHEM Fax: 920-469-8827

- Analytical Report -

Project Name: HORN OIL

Project Number: #4050

Field ID: GP-18 0-2

Lab Sample Number: 822178-003

WI DNR LAB ID: 405132750

Client: SIGMA ENVIRONMENTAL SERVICES

Report Date: 5/7/02

Collection Date: 5/1/02

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	81.2				%		5/1/02	SM 2540G M	SM 2540G M	KEG

PVOC + 1,2-DICHLORO	ETHANE -	SOIL/MET	THANOL	Prep Method: SW846 5030B			Prep Date:	5/3/02	Analyst: TLT
Analyte	F	Result	LOD	LOQ	EQL.	Units	Code	Analysis Date	Analysis M ethod
Benzene	<	200	200	480		ug/kg	K	5/3/02	SW846 8260B
1,2-Dichloroethane	<	200	200	480		ug/kg	K&	5/3/02	SW846 8260B
Ethylbenzene	<	200	200	480		ug/kg	K	5/3/02	SW846 8260B
Methyl-tert-butyl-ether	<	200	200	480		ug/kg	Κ	5/3/02	SW846 8260B
Toluene	<	200	200	480		ug/kg	Κ	5/3/02	SW846 8260B
1,3,5-Trimethylbenzene		340	250	600		ug/kg	QK	5/3/02	SW846 8260B
1,2,4-Trimethylbenzene		820	250	600		ug/kg	K	5/3/02	SW846 8260B
Xylenes, -m, -p	<	200	200	480		ug/kg	K	5/3/02	SW846 8260B
Xylene, -o	<	200	200	480		ug/kg	K	5/3/02	SW846 8260B
Dibromofluoromethane		107				%Recov		5/3/02	SW846 8260B
Toluene-d8		118				%Recov		5/3/02	SW846 8260B
4-Bromofluorobenzene		119				%Recov		5/3/02	SW846 8260B

- Analytical Report -

Project Name: HORN OIL

Project Number: #4050

_ ._ . ____

Client: SIGMA ENVIRONMENTAL SERVICES

Field ID: GP-18 2-4

Report Date: 5/7/02

Lab Sample Number: 822178-004

Collection Date: 5/1/02

WI DNR LAB ID: 405132750

Matrix Type: SOIL

Inorganic Results

Test	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method	Analyst
Solids, percent	84.3				%		5/1/02	SM 2540G M	SM 2540G M	KEG

PVOC + 1,2-DICHLOROET	HANE -	SOIL/METI	HANOL	Prep Method: SW846 5030B			Prep Date:		Analyst: TLT
Analyte	F	Result	LOD	LOQ	EQL	Units	Code	Analysis Date	Analysis M ethod
Benzene	<	250	250	600		ug/kg	K	5/3/02	SW846 8260B
1,2-Dichloroethane	<	250	250	600		ug/kg	K&	5/3/02	SW846 8260B
Ethylbenzene	<	250	250	600		ug/kg	К	5/3/02	SW846 8260B
Methyl-tert-butyl-ether	<	250	250	600		ug/kg	K	5/3/02	SW846 8260B
Toluene	<	250	250	600		ug/kg	K	5/3/02	SW846 8260B
1,3,5-Trimethylbenzene		540	300	720		ug/kg	QK	5/3/02	SW846 8260B
1,2,4-Trimethylbenzene		1500	300	720		ug/kg	Κ	5/3/02	SW846 8260B
Xylenes, -m, -p		310	300	720		ug/kg	QK	5/3/02	SW846 8260B
Xylene, -o	<	250	250	600		ug/kg	К	5/3/02	SW846 8260B
Dibromofluoromethane		83				%Recov		5/3/02	SW846 8260B
Toluene-d8		96				%Recov		5/3/02	SW846 8260B
4-Bromofluorobenzene		98				%Recov		5/3/02	SW846 8260B

CHAIN OF CUSTODY REPORT

Oak Creek, WI 53154 (414) 570-9460 FAX (414) 570-9461 1380 Busch Parkway Buffalo Grove, IL 60089-4505 (847) 808-7766 FAX (847) 808-7772

140 E. Ryan Road

Client: Cont. G. N.V.		Bill To: 5 C.S. O	7.7.7. V. M. 1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1	TAT	TAT: (STD) 4 DAY 3 DAY	2 DAY 1 DAY < 24 HRS.
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November 5, 2001

Mr. Gregory S. Michael
Wisconsin Department of Commerce
Environmental & Regulatory Services
101 West Pleasant Street, Suite 100A
Milwaukee, Wisconsin 53212

Project Reference # 4050

RECEIVED NOV 0 7 2001 ERS DIVISION

RE: Completion of Additional Site Investigation Activities for the Horn Oil Company

Commerce # 53149-1236-28B Commerce # 53149-1236-28C Commerce # 53149-1236-28D

Dear Mr. Michael:

This correspondence is being provided to present additional site investigation data for the above-referenced site. Previously, Sigma Environmental Services, Inc. (Sigma) submitted a site investigation (SI) report for review to the Department of Commerce (COMM). In COMM correspondence dated June 7, 2001, COMM stated that the SI was incomplete and additional investigation was required to further evaluate the extent of the soil impacts. A copy of COMM's correspondence is provided as an attachment. The specific need for the additional investigation was due to an absence of soil excavation surface soil sampling during site upgrade activities. The site upgrade activities consisted of the excavation of surface soils for the construction of a new above ground petroleum storage tank (AST) system.

On September 11, 2001, six geoprobe soil borings (GP-7 through GP-12) were drilled adjacent to the new AST system and former surface soil excavation area as shown on the attached figure. Soil samples were not collected from within the former excavation area since this would have required drilling through the existing concrete pad of the new AST system jeopardizing the integrity of the containment system. Also, any remaining soil impacts within the former excavation area are covered by an impermeable surface (concrete) and do not pose a direct contact threat to human health.

During drilling, two soil samples were collected from each boring for laboratory analysis of gasoline range organics and PVOC + 1,2-DCA. The sampling intervals were from 0-2 feet and 2-4 feet below ground surface. Based on the laboratory analytical results, Wisconsin Administrative Code NR 746 Table 1 and 2 values were not exceeded. Therefore, the site investigation phase of the project is complete and on behalf of Horn Oil Company, Sigma requests completion of the file review process by COMM. The analytical results are shown on the attached table and the laboratory reports are provided as an attachment.



If you have any questions or comments, please call me at (414) 768-7144.

Sincerely,

Sigma Environmental Services, Inc.

Dale C. Armbruster, P.G.

Project Manager

cc: Mr. Rick Horn - Horn Oil Company



West Pleasant Street Suite 100A Milwaukee, Wisconsin 53212

TDD: (608) 264-8777 Fax: (414) 220-5374

www.commerce.state.wi.us Scott McCallum, Governor Brenda J. Blanchard, Secretary



June 7, 2001

Mr. Rick Horn Horn Oil Co. 728 Clarendon Ave. Mukwonago, WI 53149

RE: Additional Site Investigation Required

COMMERCE # 53149-1236-28B, Horn Oil Co-Soo Line RR, BRRTS: 02-68-000831 COMMERCE # 53149-1236-28C, Horn Oil Co-Amoco Lease Site, BRRTS: 03-68-220496 COMMERCE # 53149-1236-28D, Horn Oil Co, BRRTS: 02-68-215581

Dear Mr. Horn:

On June 7, 2001, the Wisconsin Department of Commerce (Comm) evaluated the site investigation report provided by your consultant, Sigma Environmental Services Inc. (Sigma). This letter is to inform you that additional site investigation is necessary before this site enters the remediation phase, which may include the PECFA public bid process.

Additional site investigation is required because of the removal of approximately 800 tons of surface material which was removed during the upgrade of the aboveground storage tank (AST) farm. No confirmatory sampling was conducted on the bottom or sidewalls of the excavation area. This lack of information on the remaining soil contamination stops the review process and is the reason for the incomplete site investigation determination. Please conduct the appropriate sampling as outline by the Wisconsin Department of Natural Resources "Soil Sampling Requirements for LUST Site Investigations and Excavations". Please be aware that the stockpiled soils must be maintained in accordance with NR 718.05.

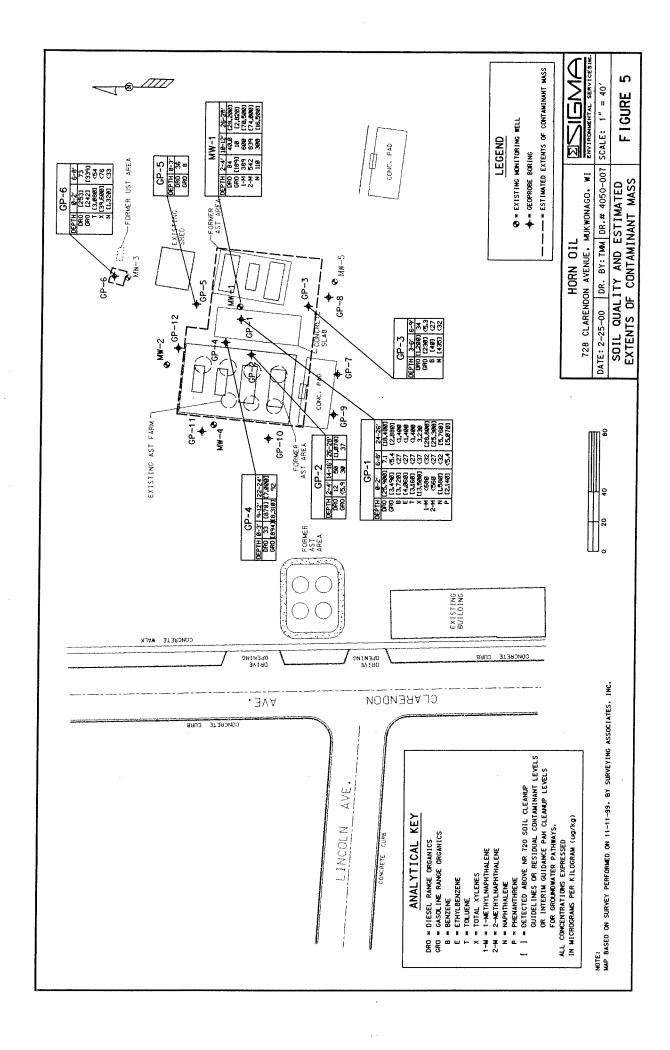
If you have any questions concerning this decision please contact the undersigned at 414.220.5375.

Sincerely,

Gregóry S. Michaél Hydrogeologist

Site Review Section

RECEIVED JUN 1 1 2001



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ug/kg <29 <30 <588 <26 <28 <30 <27 <28 <28 ug/kg <29	Michaelmen Miking C29 C30 C488 C26 C28 C30 C37 C28 C28 C30 C42 C28 C38 C48	ug/kg <29 <30 <688 <26 <28 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <20 <27 <28 <29 <29 <29 <20 <28 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <29 <28 <29 <29 <28 <28 <29 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28<	m Volatile Organic	Compounds			1		3					
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r ug/kg <29 <30 <588 <26 <28 <30 <27 <28 <28 ug/kg 38 <30	Tern Buryl Ether ug/kg 3-6 -5-68 <-26 <-28 <-30 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <-28 <td>r ug/kg <29 <30 <688 <26 <28 <30 <27 <28 <28 ug/kg 767 132 32,900 <26</td> <28	r ug/kg <29 <30 <688 <26 <28 <30 <27 <28 <28 ug/kg 767 132 32,900 <26	thylbenzene	ug/kg	<29	<30	1,050	<26	<28	<30	<27	<28	<28	2900
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natic Hydrocarbons: a.640 <36 <39 <42 <39 <39 <39 natic Hydrocarbons: tithene ug/kg <59	matic Hydrocarbons: matic Hydrocarbons: htthere ug/kg < 130	natic Hydrocarbons: natic Hydrocarbons: 42 3,640 <36 <36 <37 <39 <39 nthene ug/kg <59	3,5-Trimethylbenzene	ug/kg	330	46	8,810	<26	<28	<30	<27	<28	<28	**
ug/kg <59 <60 3,290 <52 <56 <59 <56 <56 ug/kg <100	Inthene ug/kg <59 <60 3,290 <52 <56 <59 <56 <56 hthlene ug/kg <100 <1,500 <88 <94 <100 <91 <94 <56 ene ug/kg <10 <1,500 <88 <94 <100 <91 <94 <96 sene ug/kg <21 <2,320 <5.5 <5.5 <5.9 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6	ug/kg <59 <60 3,290 <52 <55 <65 <65 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <66 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67 <67	ylenes	ug/kg	130	<42	3,640	<36	<39	<42	<37	<39	<39	4100
ug/kg <59 <60 3,290 <55 <59 <55 <55 ug/kg <100	hthylene ug/kg <100 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,500 <1,	ug/kg <59 <60 3,290 <55 <55 <59 <55 ug/kg <100	olyaromatic Hydrocarbons:								2			Interim Guidance Cleanup Levels for PAHs
ug/kg <100 <1,500 <88 <94 <100 <94 ug/kg 31 <6.0	hthylene ug/kg <100 <1,500 <88 <94 <100 <94 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <96 <96 <96 <94 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95 <95	ug/kg <100 <1,500 <88 <94 <100 <94 ug/kg 31 <6.0	cenaphthene	ug/kg	<59	09>	3,290	<52	<55	<59	<53	<55	<56	38.000
ug/kg 31 <6.0 611 <5.2 <5.5 <5.9 <5.5 <5.5 ug/kg 62 12 2,320 12 <5.5	sene ug/kg 31 <6.0 611 <5.2 <5.5 <5.9 <5.5 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <	ug/kg 31 <6.0 611 <5.2 <5.5 <5.9 <5.5 <5.5 ug/kg 62 12 2,320 12 <5.5	cenaphthylene	ug/kg	<100	<100	<1,500	<88	<94	<100	<91	<94	<95	1,000
ug/kg 62 12 2,320 12 <5.5 <5.9 <5.3 <5.5 ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.3 <5.5 ug/kg <5.9 <6.0 <88 <5.2 <5.9 <5.3 <5.5 ug/kg <5.9 <6.0 <88 <5.2 <5.9 <5.3 <5.5 ug/kg <5.9 <6.0 <88 <5.2 <5.9 <5.3 <5.5 ug/kg <5.2 <6.0 <636 <635 <5.2 <5.9 <5.3 <5.5 ug/kg <12 <12 <11 <11 <11 <11 ug/kg <6.0 <6.0 <6.7 <6.0 <6.5 <6.5 <6.5 <6.5 ug/kg <12 <11 <11 <11 <11 <11 ug/kg <6.0 <6.0 <6.0 <6.0 <6.0 <6.0 <6.0 <6.0 <6.0 <6.0	a) Anthracene ug/kg 62 12 2,320 12 <5.5 <5.9 <5.9 <5.5 <5.6 <5.0 <5.6 <5.0 <5.0 <5.0 <5.0 <5.0 <5.0 <5.0 <5.0	ug/kg 62 12 2,320 12 <5.5 <5.9 <5.9 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.5 <5.	nthracene	ug/kg	31	<6.0	611	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	3,000,000
ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.5 <5.5 ug/kg <5.9	b) Fluoranthene ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.5 <5.6 <5.6 <5.6 <5.7 <5.6 <5.9 <5.5 <5.6 <5.6 <5.0 <5.7 <5.6 <5.0 <5.0 <5.0 <5.0 <5.0 <5.0 <5.0 <5.0	ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.5 <5.5 ug/kg <5.9	enzo (a) Anthracene	ug/kg	62	12	2,320	12	<5.5	<5.9	<5.3	<5.5	<5.6	17,000
ne ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.3 <5.5 ug/kg <5.9	National background	ne ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.5 <5.5 ug/kg <5.9	enzo (b) Fluoranthene	ug/kg	<5.9	<6.0	<88	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	360,000
ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.5 <5.5 ug/kg <5.9	a) Pyrene ug/kg <5.9 <6.0 <88 <5.2 <5.9 <5.9 <5.5 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6	ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.5 <5.5 ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.3 <5.5 ne ug/kg <12 <12 <12 <5.5 <5.5 <5.5 ne ug/kg <12 <12 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11	enzo (k) Fluoranthene	ug/kg	<5.9	<6.0	<88	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	870,000
ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.5 <5.5 ug/kg 62 <6.0	ghi) Perylene ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.5 <5.6 1e ug/kg 62 <6.0	ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.5 <5.5 nug/kg 62 <6.0	anzo (a) Pyrene	ug/kg	<5.9	<6.0	<88	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	48,000
ug/kg 62 <6.0 635 12 <5.5 <5.9 <5.3 <5.5 anthracene ug/kg <12	ne ug/kg 62 <6.0 635 12 <5.5 <5.3 <5.6 <5.6 10a,h)anthracene ug/kg <12	ug/kg 62 <6.0 635 12 <5.5 <5.9 <5.5 <5.5 anthracene ug/kg <12	enzo (ghi) Perylene	ug/kg	<5.9	<6.0	<88	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	6,800,000
anthracene ug/kg <12 <12 <180 <10 <11 <12 <11 <11 <11 <11 <11 <11 <11 <11	(a, h)anthracene ug/kg <12 <18 <10 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11	anthracene ug/kg <12 <180 <10 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <	hrysene	ug/kg	62	<6.0	635	12	<5.5	<5.9	<5.3	<5.5	<5.6	37,000
ug/kg 35 30 5,760 <10 <11 <12 <11 <11 <11 <11 <11 <11 <11 <11	thene ug/kg 46 <12 5,290 <10 <11 <12 <11 <11 <11 <11 <11 <11 <11 <11	ug/kg 46 <12 5,290 <10 <11 <12 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11<	ibenzo(a,h)anthracene	ug/kg	<12	<12	<180	<10	<11	<12	<11	<11	<11	38,000
2 3 cd) Durana units (50 c) 5,760 (10 c) 11 c) 11	e ug/kg 35 30 5,760 <10 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <td>ug/kg 35 30 5,760 <10 <11 <12 <2.5 <5.5 <2.5 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.8 <2.8 <2.7 <2.8 <2</td> <td>uoranthene</td> <td>ug/kg</td> <td>46</td> <td><12</td> <td>5,290</td> <td><10</td> <td><11</td> <td><12</td> <td><11</td> <td><11</td> <td><11</td> <td>200'000</td>	ug/kg 35 30 5,760 <10 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <11 <12 <2.5 <5.5 <2.5 <2.5 <2.5 <2.5 <2.5 <2.5 <2.5 <2.5 <2.5 <2.5 <2.5 <2.5 <2.5 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.8 <2.8 <2.7 <2.8 <2.8 <2.7 <2.8 <2.8 <2.7 <2.8 <2.8 <2.7 <2.8 <2.8 <2.7 <2.8 <2.8 <2.8 <2.8 <2.8 <2.8 <2.8 <2.8 <2.8 <2.8 <2.8 <2.8 <2	uoranthene	ug/kg	46	<12	5,290	<10	<11	<12	<11	<11	<11	200'000
24 Cu' Cu' Cu' Cu' Cu' Cu'	(1, 2, 3-cd) Pyrene ug/kg <6.0 <88 <5.2 <5.5 <5.3 <5.6 Ylnaphthalene ug/kg 542 839 74,000 <26 <28 <3.2 <3.3 <3.3 Ylnaphthalene ug/kg 110 300 74,000 <26 <28 <3.0 <27 <28 <28 Allaphthalene ug/kg 110 300 74,000 <26 <28 <30 <27 <28 <28 Allaphthalene ug/kg 110 300 76,500 <31 <36 <37 <28 <38 <38 <33 <33 <33 <45.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.6 <5.	ene ug/kg <5.9 <6.0 <88 <5.2 <5.5 <5.9 <5.5 <5.5 ug/kg 389 600 70.500 <31	uorene	ug/kg	35	30	5,760	<10	<11	<12	×11	<11	<11	100,000
elle ug/kg <5.9 <5.9 <5.3 <5.5	yInaphthalene ug/kg 389 600 70,500 <31 <36 <32 <33 <33 <33 <33 <33 <33 <38 <32 <28 <30 <27 <28 <28 <32 <28 <28 <28 <28 <28 <28 <28 <33 <38 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <35 <45 <56 <33 <45 <56 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45 <45	ug/kg 389 600 70,500 <31 <36 <32 <33 ug/kg 542 839 74,000 <26	deno (1, 2, 3-cd) Pyrene	ug/kg	<5.9	<6.0	<88	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	000'089
ug/kg 389 600 70.500 <31 <33 <36 <32 <33	yInaphthalene ug/kg 542 839 74,000 <26 <28 <30 <27 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <28 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <33 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6 <45.6	ug/kg 542 839 74,000 <26 <28 <30 <27 <28	-Methylnaphthalene	ug/kg	389	009	70,500	<31	<33	<36	<32	<33	<33	23,000
ug/kg 542 839 74,000 <26 <28 <30 <27 <28	alene ug/kg 110 300 16,500 <31 <36 <32 <33 <33 <33 threne threne ug/kg 93 6 10,300 <5.2		Methylnaphthalene	ug/kg	542	839	74,000	<26	<28	<30	<27	<28	<28	20,000
ug/kg 110 300 16,500 <31 <33 <36 <32 <33	threne ug/kg 93 6 10,300 <5.2 <5.5 <5.9 <5.3 <5.5 <5.6	ug/kg 110 300 16,500 <31 <33 <36 <32 <33	aphthalene	ug/kg	110	300	16,500	<31	<33	<36	<32	<33	<33	400
threne ug/kg 93 6 10,300 <5.2 <5.5 <5.9 <5.3 <5.5	ug/kg 100 43 6,230 15 <5.5 <5.9 <5.3 <5.5 <5.6	threne ug/kg 93 6 10,300 <5.2 <5.5 <5.9 <5.3 <5.5	nenanthrene	ug/kg	93	9	10,300	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	1,800
ug/kg 100 43 6,230 15 <5.5 <5.9 <5.3 <5.5		ug/kg 100 43 6,230 15 <5.5 <5.9 <5.3 <5.5	yrene	ug/kg	100	43	6,230	15	<5.5	<5.9	<5.3	<5.5	<5.6	8,700,000

								Table 2									
							8	Soll Quality Results Hom Oil	esults								
							2	kwonago, Wi	B COUSIN								
Boring ID			GP-1			CBS			000								
Depth (feet bgs)		0-2	6-8'	24-26	2-4'	14-16	26-28	3.6	9.9	186.00	100	5 CF-5			GP-5		NR 720 Soil
Lead	mg/kg	69	7.7	5,5	11	9.3	=	23	7 6	B	286	3-12	67-77	50	21-01	24-26	Cleanup Levels
Diesel Range Organics	mg/kg	25,900	7.1	18,400	12	90	1.070	1 200	34	087	200	B. 1	0.0	13	9.3	10	200
Gasoline Range Organics	mg/kg	3,490	<5.4	2,880	<5.9	30	37	026	26.90	0.00	32	919	7,000	36	<5.8	<5.9	100
Petroleum Votatile Organic Compounds:	Compound					3		***	0.0	0.05	480	8,310	92	80	<5.8	<5.9	100
Benzene	ug/kg	3,720	<27	<1.400	<30	<28	- 680	40	763	000	**	000	99				
1,2-Dichloroethane	ng/kg	<1,350	<27	<1,400	<30	<28	c60	025	200	290	*	6075	67.V	825	<29	<29	5,5
Ethylbenzene	ng/kg	4,060	<27	<1,400	<30	<28	<80	110	202	230	7 5	6075	67.7	628	629	<29	4.9
Methyl Tert Butyl Ether	ug/kg	<1,350	<27	<1,400	<30	<28	<60	47	<27	300	234	2080	677	875	675	623	2900
Loluene	ng/kg	3,160	<27	<1,400	<30	<28	09>	30	765	230	134	000	67	075	RZ	675	
1,2,4-Trimethylbenzene	ng/kg	33,800	<27	34,600	<30	<28	09>	3.990	36	230	5	2080	675	100	875	675	1500
1,3,5-Trimethylbenzene	ug/kg	5,640	<27	5,880	<30	<28	09>	1810	<227	230	100	080	67	200	875	675	
Xylenes	ng/kg	13,500	<37	3,230	<42	<39	<84	798	437	542	48	2404	87	444	675	625	
									7	7	40	4045	240	135	<41	<41	4100
Polyaromatic Hydrocarbons:	,																Interim Guidance Cleanup Levels for
Acenaphthene	ua/ka	<1 100	chd	- CEBO	250	397	007	0									PAHS
Acenaphthylene	na/ko	<1 900	501	C080	200	200	200	9	503	095	<120	<290	<280	<110	<58	<59	38,000
Anthracene	na/ka	<110	C5.4	334	204	100	200	300	06>	<100	<200	<480	<480	<190	<99	<100	1,000
Benzo (a) Anthracene	no/ka	1120	CE 4	- KB	9	0.00	20.0	3	<5.3	<6.0	<12	127	37	11	<5.8	<5.9	3,000,000
Benzo (b) Fluoranthene	no/ka	147	ch 4	- FE	20.0	0.00	×6.0	011	<5.3	<6.0	65	<29	<28	71	<5.8	<5.9	17,000
Benzo (k) Fluoranthene	na/ka	282	554	, 558 658	0 W	20.0	0.00	×6.0	c2:3	<6.0	32	<29	<28	16	<5.8	<5.9	360,000
Benzo (a) Pyrene	na/ka	327	55.4	c58	C. C	2 4	0.00	0.00	20.3	<6.0	29	¢29	<28	16	<5.8	<5.9	870,000
Benzo (ghi) Perylene	ug/ka	225	<5.4	858	C.5.0	2,00	0.00	0.00	20.3	66.0	47	<29	<28	37	<5.8	<5.9	48,000
Chrysene	ua/ka	180	55.4	CER.	650	244	000	0.0	200	0.00	/9	623	<28	35	<5.8	<5.9	6,800,000
Dibenzo(a,h)anthracene	ua/ka	<220	511	6420	640	2.5	20.0	20.0	50.3	68.0	28	<29	<28	26	<5.8	<5.9	37,000
Fluoranthene	ua/ka	981	411	1 840	243		717	715	115	<12	<24	×60	<55	<22	<12	<12	38,000
Fluorene	no/ko	2 030		200	7 17	7	215	133	10	<12	110	254	60	236	<12	<12	500,000
Indeno (1, 2, 3-cd) Pyrene	in/kn	62	184	1,900	715	1	<12	157	20	<12	<24	1,120	172	<22	<12	<12	100,000
1-Methyinaphthalene	in/kn	6890	200	000	8.00	40.0	<6.0	×6.0	<5.3	e6.0	37	<29	<28	24	<5.8	<5.9	680,000
2-Methylnaphthalana	Day on	2000	707	20,000	436	553	28	1,570	<32	<36	99	8,660	872	55	<35	<35	23,000
Nachthalaca	Sales.	2007	175	mercy	230	<28	<30	1,810	<27	<30	171	<140	<140	112	<29	<29	20,000
Phananthrana	Swiften	000	77	09/6	<36	<33	<36	435	<32	<36	76	<180	<170	87	<35	<35	400
Pyrana	DA/NO.	74.44	4.0.4	0,070	<5.9	<6.5	<6.0	218	18	<6.0	43	658	126	112	<5.8	<5.9	1 800
KFV.	DA/NO	200	42.4	1,150	<5.9	<5.5	<6.0	110	6.4	<6.0	61	439	149	18	<5.8	<5.9	8,700,000
	MA - Mot Annia	and man															

NA = Not Analyzed

(BOLD) = Detected Above NR 720 Soil Cleanup Guidelines or Residual Contaminant Levels or Interim Guidance PAH Cleanup Levels for Groundwater Pathways

** = No Standard Established

Sigma Environmental Services, Inc.

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Acenaphthene	ua/ka	<280	c55	040	VIV												Creanup Leveis for PAHs
Acenaphthylene	10/60	7400	3	200	4	¥.	NA NA	AN	AM	W	NA	AN	AM	AN	NA	ΨN	38 000
Anthrope	Rush	204	CRS	2001>	AA	¥	¥	¥	AA	NA	NA	NA	MA	MIA	VIV		200,000
Allinatelle	ng/kg	<28	<5.5	<5.9	AN	AM	MA	MIA	AIA	1			4	5	VV	NA.	1,000
Benzo (a) Anthracene	ug/kg	187	<5.5	<5.9	AM	MA	44	5	5	5	NA.	Y.	AA	A	NA NA	AA	3,000,000
Benzo (b) Fluoranthene	uo/ka	100	CAR	040	VIV	5	5	Y.	NA.	Y.	Y.	NA NA	AA	AA	¥	AN	17.000
Benzo (k) Fluoranthene	ug/ka	54	<5.5	689	47	44	Y.	Y .	¥.	AN	AN	AA	NA	NA	¥	AN.	360,000
Benzo (a) Pyrene	ug/kg	58	<5.5	699	N AN	NA NA	44	2	2	Y.	¥.	¥	¥	AA	NA	¥	870,000
Benzo (ghi) Perylene	ng/kg	62	<5.5	659	MA	414	5	5	NA.	¥.	AN	¥	NA A	AA	NA	AN	48,000
Chrysene	ng/kg	58	×5.5	659	AM	2	2	2	Ž.	Y.	AN	¥.	NA	NA	NA	AN	6,800,000
Dibenzo(a,h)anthracene	ug/kg	<55	411	<12	AM	47	414	2	Ž.	¥.	AN.	¥	AA	AA	NA	NA	37,000
Fluoranthene	ug/kg	440	411	<12	AN	YN.	4	5	2	¥.	AA.	AN A	A	AA	NA	AN	38,000
Fluorene	ug/ka	62	<11	<12	AM	5 2	2 2	4	Y.	Y.	AA	NA	¥.	NA	AA	¥	200,000
Indeno (1, 2, 3-cd) Pyrene	ug/kg	53	<5.5	459	AM	42	2	2	ď.	¥:	¥	AA	A A	AN	NA	NA	100,000
1-Methylnaphthalene	ug/kg	473	<33	435	AN	AM	2	5	4	Ž	Y.	AA	¥.	AA	¥	NA	680,000
2-Methylnaphthalene	ug/ka	1.210	427	620	MA	42	2	5	ž	ž:	¥.	AN	¥.	Y.	AM	¥	23,000
Naphthalene	ua/ka	1.320	<33	636	VAN	V V	2	2	ď.	Y.	¥.	¥	NA NA	NA	NA	Ą	20,000
Phenanthrene	ua/ka	198	<5.5	C 20	VIV	5 5	2	2	Y.	Y.	AN	AA	AA	NA	NA	AN	400
Pyrene	ua/ka	341	<5.5	650	V.	5	5	2	ž	Y.	Y.	¥.	AA	NA	AN	AN	1,800
KEY:						2	Y.	NA.	NA NA	NA	NA	NA	AA	NA	NA	AN	8,700,000

NA = Not Analyzed

BOLD = Detected Above NR 720 Soil Cleanup Guidelines or Residual Contaminant Levels or Interim Guidance PAH Cleanup Levels for Groundwater Pathways

** = No Standard Established



Project Reference # 4050



FAX: 414-768-7158

June 7, 2001

Mr. Greg Michael Wisconsin Department of Commerce **Environmental and Regulatory Services** 101 West Pleasant Street, Suite 100A Milwaukee, Wisconsin 53212

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JUN 0 8 2001

ERS DIVISION

RE: Addendum to the Site Investigation Report for the Horn Oil Facility Located in

Mukwonago, Wisconsin

BRRTS # 0268000831, 0368220496, 0268215581

FID # 268168670, 268563460, 268557960

PECFA # 53149-1236-28 B, C, D

Dear Mr. Michael:

This correspondance is to serve as an addendum to the above-referenced site investigation report. In the investigation report, it is referenced that approximately 800 tons of petroleum impacted soil was excavated during the installation of the new above-ground petroleum storage tank system. The purpose of the soil excavation was to bring the ground surface to the appropriate grade for the new AST system installation.

On Figure 1 which is provided as an attachment, the excavation area is shown. The area which now contains the new AST's was excavated to a depth of approximately 4 feet below ground surface and the area which now includes the concrete slab used as a loading area was excavated to an approximate depth of 1 foot below ground surface. Sigma personnel were not present during excavation activities and excavation surface soil samples were not collected. The excavated soil is stockpiled on-site north of the new AST system as shown on Figure 1. The information regarding the soil excavation is based on information that was given to Sigma by Horn Oil Company.

Also, the site investigation report inaccurately references four Commerce numbers which are 53149-1236-28A, B, C, and D. Commerce # 53149-1236-28A was for a separate project that has been closed. Commerce #'s 53149-1236-28B, C, and D are the numbers the apply to this project.

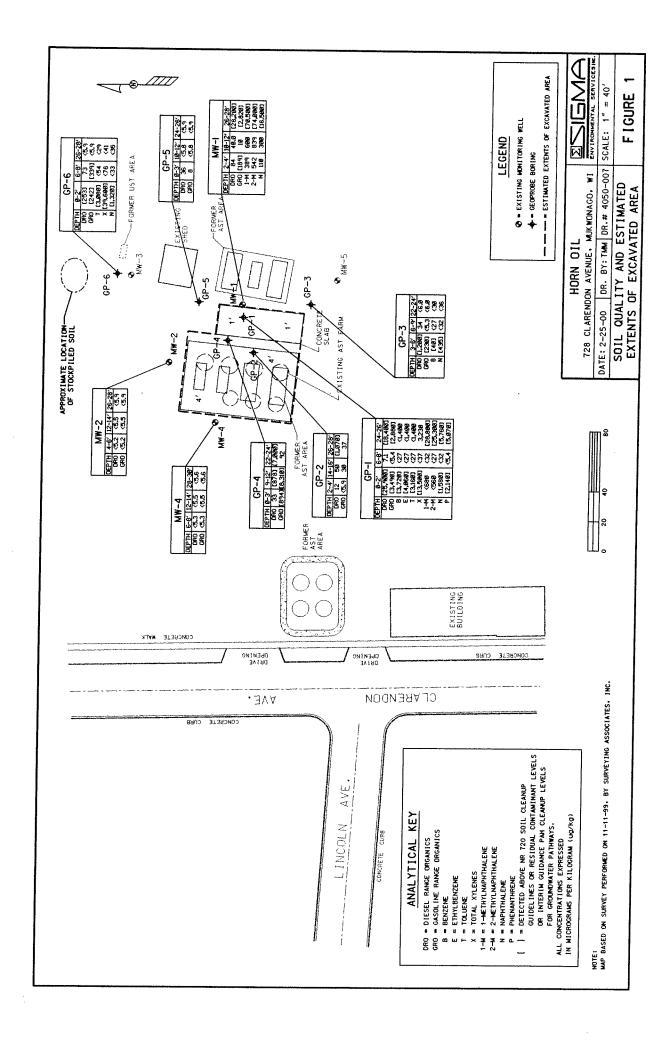
If you should have any additional questions regarding the excavation activities, please call me at (414) 768-7144.

Sincerely,

Sigma Environmental Services, Inc.

Dale C. Armbruster, P.G.

Project Manager



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APR 23 2001 PECFA SITE REVIEW MILWAUKEE OFFICE

SUBSURFACE/HYDROGEOLOGIC
INVESTIGATION REPORT
HORN OIL
728 CLARENDON AVENUE
MUKWONAGO, WISCONSIN



BRRTS#'s 0268000831, 0368220496, 0268215581 FID #'s 268168670, 268563460, 268557960 PECFA #'s 53149-1236-28A,B,C,&D

PREPARED FOR:

MR. RICK HORN

HORN OIL

728 CLARENDON AVENUE

MUKWONAGO, WISCONSIN 53149

PREPARED BY:

SIGMA ENVIRONMENTAL SERVICES, INC.

220 EAST RYAN ROAD
OAK CREEK, WISCONSIN 53154
(414) 768-7144

PROJECT REFERENCE #4050 MARCH 2001

Jodi M. VanderVelden

Staff Geologic Engineer

Dale C. Armbruster, P.G.

Project Manager

Randy E. Bóness, P.G.

Senior Project Manager

CERTIFICATIONS

"I, Randy E. Boness __, hereby certify that I am a scientist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."

RANDY E. BONESS
Signature and title

P.G. Stamp BROWN DEER. ODate

"I, <u>Dale C. Armbruster</u>, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."

DALE C.

ARMBRUSTER

G-750

RACINE 3-21-02

Signature and title

Project Name

Project Name

Project Name

Project Name

Residuation

Project Name

Project

"I, <u>Jodi M. VanderVelden</u>, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code."

Signature and title Staff Engineer/Hydrogeologist Date

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EXECUTIVE SUMMARY

Horn Oil Company, retained Sigma Environmental Services, Inc. (Sigma) of Oak Creek, Wisconsin, to conduct a subsurface investigation of the three adjacent properties located at 726 Clarendon Avenue, 728 Clarendon Avenue and 502 Oakland Avenue, Mukwonago, Wisconsin (hereafter the "site"). The purpose of the subsurface investigation was to 1) define the nature and extent of petroleum hydrocarbon impacts to soil and groundwater beneath the site associated with the former gasoline underground storage tank (UST) and above ground storage tank (AST) systems; 2) satisfy the requirements of Wisconsin Administrative Code, Chapter NR 716.05 for subsurface investigations; 3) generate sufficient geologic and hydrogeologic data to evaluate risks to the surrounding environment and human health; and 4) evaluate potential remedial alternatives and provide a recommendation for case closure.

Separate petroleum releases (one on each property) were reported to the WDNR on August 5, 1993, January 20, 1994, and February 26, 1999 which correspond to the addresses of 728 Clarendon Avenue, 726 Clarendon Avenue, and 502 Oakland Avenue. The WDNR subsequently recognized Horn Oil Company as the responsible party. Due to the proximity of the three releases, Sigma implemented one subsurface investigation to delineate the vertical and lateral extent of impacts from the UST and AST systems.

From August 1999 through May 2000, Sigma conducted a subsurface investigation which included the advancement of six Geoprobe™ soil borings, drilling of five hollow stem auger soil borings, and completion of the hollow stem auger borings as monitoring wells. Soil samples were collected from each soil boring for laboratory analysis. A review of soil laboratory data results indicates that Gasoline Range Organic (GRO) and/or Diesel Range Organic (DRO) constituents were detected in six soil borings above applicable NR720 standards. Additionally, elevated soil impacts were identified at the site within four feet of ground surface, at the water table interface, and above Chapter NR 746 Table 1 values. Based on the results of the investigation, the extent of the soil-related hydrocarbon impacts from the Horn Oil release is delineated.

Groundwater samples were collected from the monitoring well network and submitted for laboratory analysis on three sampling events. A review of the groundwater quality data indicates that 1,2 Dichloroethane concentrations were slightly above Chapter NR 140 Enforcement Standards (ES) in monitoring well MW-1; however down gradient monitoring wells MW-2 and MW-4 do not contain any concentrations above laboratory detection limits.

Based on soil and groundwater quality data collected during the subsurface investigation, the extent of soil and groundwater impacts associated with the former UST and AST systems has been defined to the extent practical. Three Chapter NR 746 risk criteria (elevated soil impacts within four feet of ground surface, at the water table interface, and above Chapter NR 746 Table 1 values) were not satisfied for the site. Therefore, the implementation of a remediation strategy is required to restore subsurface soil conditions to acceptable levels as determined by the WDNR due to the elevated detected concentrations of petroleum hydrocarbons in the soil. Sigma recommends the completion of a remedial action plan analysis that meets the requirements of COMM 47 and Chapter NR 722 and submit the analysis to the respective state agencies for approval.

1. INTRODUCTION

Sigma Environmental Services, Inc. (Sigma) was retained by Horn Oil to provide environmental consulting services for remedial investigation activities located at 726 and 728 Clarendon Avenue and 502 Oakland Avenue, Mukwonago, Wisconsin (hereafter "the site", Figure 1). All three addresses were investigated under one investigation due to the proximity of the source areas.

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On August 5, 1993, Wisconsin Central Ltd Railroad collected soil samples from three soil borings drilled in a former petroleum AST area at 728 Clarendon Avenue. Results of the soil sample analysis indicated a release had occurred which was reported to the WDNR. At the time the release was reported, the property was owned by the railroad but leased by Horn Oil Company. Horn Oil Company has since purchased the property.

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On January 20, 1994, a petroleum release at 726 Clarendon Avenue was initially reported to the WDNR by Fluid Management on behalf on the Railroad. The release was re-reported to the WDNR on May 7, 2000 due to the initial report not being present in the WDNR database. The release occurred from a former petroleum UST system. The property was owned by the Railroad and leased by Amoco Oil Company at the time the release was reported. Horn Oil Company has since purchased the property.

ν Δ On February 26, 1999, a petroleum release at 502 Oakland Avenue was reported to the WDNR by Key Environmental on behalf of the Railroad. The release occurred from a former petroleum AST system. At the time the release was reported, the property was owned by the Railroad but leased by Horn Oil Company. Horn Oil Company has since purchased the property.

The former petroleum AST system located at 728 Clarendon Avenue and 502 Oakland Avenue were connected by underground piping therefore classifying them as one AST system.

The following table summarizes the address, release notification date, and tank system of each reported release area; locations of the tanks are depicted on Figure 2. All tank information summarized in the following table are presented in Attachment 1.

ADDRESS	BRRTS/ FID	RELEASE NOTIFICATION DATE	TANK INFORMATION
726 Clarendon Avenue	0368220496/ 268563460	1/20/94 5/7/99	Tank #368501 (1,500 gallon leaded gasoline UST)
728 Clarendon Avenue	0268000831/ 268168670	8/5/93	Tank #213940 (18,944 gallon fuel oil AST) Tank #213942 (10,180 gallon fuel oil AST) Tank #213943 (10,357 gallon fuel oil AST) Tank #213944 (17, 026 gallon fuel oil AST)
502 Oakland Avenue	0268215581/ 268557960	2/26/99	Tank #213938 (19,054 gallon leaded gasoline AST) Tank #213939 (10,144 gallon fuel oil AST) Tank #213941 (19,054 gallon fuel oil AST)

Note that the ASTs located at 728 Clarendon Avenue and 502 Oakland Avenue were connected by underground piping, and consequently, are considered one AST system.

Sigma subsequently implemented a subsurface investigation of the site on August 16, 1999 to delineate the vertical and lateral extent of impacts from the former UST/AST systems.

1.1 General Discussion. Sigma has prepared this report to document and discuss previous site activities, present investigation results, and provide an interpretation of the data generated and how it relates to established State of Wisconsin rules and regulations. All investigation activities were completed in accordance with Wisconsin laws and regulations at the time work was performed; specifically, Wisconsin Administrative Code, Chapter NR 700 through NR 736 (Chapter NR 700-736), Wisconsin Administrative Code, Chapter NR 140 (Chapter NR 140), Wisconsin Administrative Code, Chapter NR

141 (Chapter NR 141) and Wisconsin Department of Commerce Codes (COMM) 46 and 47.

2. PURPOSE AND SCOPE OF WORK

- 2.1 Purpose of Work. The purpose of Sigma's investigation was to 1) define the nature and extent of petroleum hydrocarbon impacts to soil and groundwater beneath the site associated with the former AST and UST systems; 2) satisfy the requirements of Chapter NR 716.05 for subsurface investigations; 3) generate sufficient geologic and hydrogeologic data to evaluate remedial options to address the impacted soil and groundwater identified beneath the site; 4) evaluate potential risk to human health and the surrounding environment; and 5) provide recommendations for future remedial activities.
- 2.2 <u>Scope of Work.</u> Sigma's Scope of Work for this project included an evaluation of the presence, type, and extent of soil and groundwater impacts in addition to a determination of the subsurface characteristics (soil types and hydrogeologic conditions). The following activities were completed relevant to tank closure activities and the subsurface investigation at the site:
 - o The advancement of six Geoprobe™ soil borings (GP-1 through GP-6) in August 1999 to delineate the lateral and vertical extent of soil impacts. Soil samples were selected from within the 0-4 feet bgs depth interval, the depth exhibiting the highest flame ionization detector (FID) reading or the observed water-table interface, and a depth interval in between.
 - The advancement of five hollow stem auger (HSA) soil borings in October 1999 to further evaluate extents of soil impacts observed during the Geoprobe™ investigation. Soil samples were collected at the observed groundwater interface or the interval exhibiting the highest FID measurement and two intervals above the observed groundwater interface. All five soil borings (MW-1 through MW-5) were completed as groundwater monitoring wells to evaluate groundwater quality and determine hydrogeologic conditions beneath the site.
 - The completion of a professional site survey to determine monitoring well and soil boring locations and elevations. Monitoring well elevations in

conjunction with depth to groundwater measurements were used to determine the groundwater flow direction and gradient.

- The laboratory analysis of soil samples for one or more of the following parameters: Wisconsin Modified Method Gasoline Range Organic Compounds (GRO), Wisconsin Modified Method Diesel Range Organics (DRO), EPA Method 8020 Petroleum Volatile Organic Compounds plus 1,2 Dichloroethane, EPA Method 8310 Polynuclear Aromatic Hydrocarbons, and EPA Method 6010 Total Lead. Three soil samples were also analyzed for biofeasibility parameters including total organic carbon, orthophosphate, nitrate-nitrite, K-nitrogen, and ammonianitrogen.
- The collection of three rounds of groundwater samples from the monitoring well network for laboratory analysis of one or more of the following parameters: EPA Method 8021 VOCs, EPA Method 8020 PVOC plus 1,2 Dichloroethane, and Dissolved Lead. Additional groundwater samples were submitted for analysis of select biodegradation parameters such as nitrate, sulfate, and manganese. Insitu field parameters such as redox, temperature, ferrous iron, dissolved oxygen, and pH were also collected on select sampling events from the groundwater monitoring well network.
- The removal of all seven ASTs associated with the 728 Clarendon Avenue and 502 Oakland Avenue system in 1991 and 2000, respectively. ASTs were removed by Horn Oil Company; no closure assessment was conducted due to the previously documented release. Approximately 800 tons of surficial soil were excavated and stockpiled on-site during the replacement of the AST system.

Additional details regarding the completion of each field activity and an interpretation of the data collected during the investigation are included in Sections 4 and 5 of this report.

2.3 <u>Project Team.</u> The following firms and contractors provided services during remedial investigation activities completed at the site.

Client:

Horn Oil Company

728 Clarendon Avenue

Mukwonago, Wisconsin 53149.

Telephone: (262)363-7411

Client Contact: Mr. Rick Horn

Environmental Consulting Firm:

Sigma Environmental Services, Inc.

220 East Ryan Road

Oak Creek, Wisconsin 53154-4533

Telephone: (414) 768-7144

Project Manager: Mr. Dale Armbruster, P.G.

Drilling Services:

Mid America Drilling Services

700 Hicks Drive

Elburn, IL 60119-9059

Telephone: (630)-365-0600

Geoprobe™ Services:

On-Site Environmental

3701 Token Road

DeForest, WI 53532

Telephone: (608) 837-8992

Laboratory Services (Soil and Groundwater):

Test America

602 Commerce Drive

Watertown, WI 53094

Telephone: (920)261-1660

WDNR Certification: #128053530

Surveying Services:

Surveying Associates, Inc. 2554 North 100th Street Wauwatosa, Wisconsin Telephone: (414)257-2212

3. SITE AND SURROUNDING AREA DESCRIPTION

3.1 <u>Site Location and Description.</u> The property addresses are 726 Clarendon Avenue, 728 Clarendon Avenue, 502 Oakland Avenue, Mukwonago, Wisconsin (Northeast 1/4 of the Northeast 1/4, Section 26, Township 5 North, Range 18 East, Waukesha County, Wisconsin). The site location is shown on Figure 1.

The properties of concern are covered by a building, concrete, or gravel. Past and current use of the properties of concern is a petroleum bulk plant. The property is bordered by residential property to the north and west, commercial business to the south, and Wisconsin Central Limited Railroad to the east.

Based on information obtained from the USGS topographic map (Mukwonago Quadrangle, Wisconsin 7.5 Minute Series, 1976) and a professional site elevation survey, the elevation of the site is approximately 840 feet above mean sea level (MSL). The site topography is generally flat. The closest surface water bodies include an unnamed lake, Lower Phantom Lake, and Mukwonago River at locations approximately 1,500 feet northeast, 5,000 feet southeast, and 6,000 feet south of the site, respectively. A site plan map is presented as Figure 2.

3.1.1 <u>Utility Review.</u> Based on information obtained by Digger's Hotline markings, a professional survey, city engineer, and a site inspection by Sigma personnel, subsurface utilities such as water, sanitary sewer, and storm sewer are present along Clarendon Avenue. Hydrogeologic information generated during the subsurface investigation indicates that the depth to groundwater and/or smear zone at the site is greater than 20 feet below ground surface, significantly deeper than typical utility depths. Direction of groundwater flow was determined to be predominantly toward the northeast. Monitoring wells MW-2 and MW-4 are located down gradient from the source area and up gradient from the

utility lines. Groundwater impacts were reported below applicable standards in both monitoring wells, further supporting that the utilities are not at risk of receiving impacted groundwater from the Horn Oil release. Groundwater quality data is discussed in Section 5.2.3 of this report.

3.1.2 Potential Receptors. Well construction reports, obtained from the Wisconsin Geological and Natural History Survey (WGNHS), indicate that one private well constructed after 1936 is documented within 1,000 feet of the site. The residential property to the west of the site (across Clarendon Ave.) had a documented private well at one time. The private well is likely no longer in use as residents of Mukwonago receive drinking water from the municipal supply. In addition, well constructor reports obtained from the Wisconsin Geological and Natural History Survey (WGNHS) indicate a low permeable clay layer exists between 35 and 80 feet bgs, thereby limiting the likelihood of petroleum hydrocarbons impacting the deeper aquifer.

4. INVESTIGATIVE PROCEDURES

Sigma completed a subsurface remedial investigation at the site that consisted of the advancement of six Geoprobe™ soil borings, five hollow stem auger soil borings, and the conversion of the five hollow stem auger soil borings to groundwater monitoring wells. The monitoring well network was developed and sampled upon completion of the monitoring well installation activities. The following is a detailed discussion of investigation activities and methodologies. Sigma's Standard Field Methodologies used during the subsurface investigation are presented as Appendix A.

4.1 Geoprobe™ Soil Borings. On August 16 and 17, 1999, Sigma personnel supervised the advancement of six Geoprobe™ soil borings (GP-1 through GP-6) to depths ranging from 24 feet bgs to 28 feet bgs within the property boundaries. The geoprobe soil borings were positioned to delineate the vertical and lateral extent of impacts and to provide information for additional soil boring/monitoring well installation activities.

During boring advancement, soil samples were collected on a continuous basis and described on the basis of color, texture, grain size, and plasticity, and classified in accordance with the Unified Soil Classification System (USCS). The soil classifications, sampling intervals, and descriptions are presented on the Soil Boring Logs in Appendix B.

Soil samples were collected from each sampling interval and containerized for headspace analysis using a MicrotipTM PID that was periodically calibrated for direct response to 100 instrument units per isobutylene (i.u.) in air. Sigma's Standard Field Screening Methodologies are presented in Appendix A. Field screening results are presented on Soil Boring Logs in Appendix B.

Soil samples were also collected from each sample interval, containerized, and preserved (where necessary) for potential laboratory analysis of one or more of the following analytes: GRO, PVOC plus 1,2 Dichloroethane, PAH, Total Lead, and select biofeasibility parameters. Select soil samples, accompanied by a chain-of-custody document, were submitted to a certified laboratory for analysis based on field screening results and observations.

All Geoprobe[™] soil borings were subsequently abandoned in accordance with Chapter NR 141 requirements. The abandonment forms are included as Appendix C. Geoprobe[™] soil boring locations are presented on Figure 2.

4.2 Soil Boring/Monitoring Well Installation and Monitoring Well Development. On October 25 and 26, 1999, five hollow stem auger (HSA) soil borings (MW-1 through MW-5) were advanced to a depths ranging from 35 to 36 feet bgs within the property boundaries. The soil boring/monitoring wells were strategically located to evaluate hydrogeologic conditions at the property relative to the former UST locations, AST locations, and property boundaries. All HSA soil borings were either blind drilled or sampled using split spoon sampling techniques and installed with a truck mounted drill rig. Soil boring/monitoring well locations are presented on Figure 2.

Soil samples from the HSA soil borings were collected and described following the methodology discussed in Section 4.1. Select soil samples, accompanied by a chain-of-custody document, were submitted to a certified laboratory for

analysis of one or more of the following analytes: GRO, DRO, PVOC plus 1,2 Dichloroethane, and PAH.

All five hollow stem auger soil borings were completed as groundwater monitoring wells (MW-1 through MW-5) in accordance with Chapter NR 141 groundwater monitoring well requirements. Each monitoring well included a 15-foot length of two-inch diameter PVC screen (0.010 slot) connected to an appropriate length of PVC riser pipe. The screened portion of each monitoring well was positioned to intercept the observed water table at the time of drilling activities. Monitoring Well Construction Forms (WDNR Form 4400-113A) are presented as Appendix D.

Upon completion of monitoring well installation, Sigma personnel developed monitoring wells MW-1 through MW-5 in accordance with Chapter NR 141 by alternately surging and bailing the wells with clean Teflon[™] bailers and evacuating water and sediment from the wells with a decontaminated peristaltic pump. Monitoring Well Development Forms (WDNR Form 4400-113B) are presented as Appendix E. Sigma's Standard Field Methodologies used during monitoring well development are presented as Appendix A.

- 4.3 <u>Static Water-Level Measurements.</u> Prior to each groundwater sampling event, static water levels were obtained from the monitoring well network for determining the lateral groundwater flow direction and horizontal hydraulic gradient. All water levels were measured using an electronic water-level indicator and were referenced to the surveyed monitoring well top of casing mark. Static groundwater elevations for each monitoring well are presented in Table 1.
- 4.4 Groundwater Sampling Program. Groundwater samples were collected from the monitoring well network in November 1999, February 2000, and May 2000. The groundwater samples collected from the wells were submitted under chain-of-custody document to a certified laboratory for chemical analysis of at least one of the following parameters: VOCs, PAHs, PVOC plus 1,2 Dichloroethane, and Dissolved Lead. Duplicate groundwater samples were also collected from the monitoring well network and analyzed for in situ measurements (redox, temperature, ferrous iron, dissolved oxygen, and pH) and biofeasibility parameters (methane, nitrate, sulfate, and manganese).

- 4.5 <u>Surveying.</u> The elevations and locations of the monitoring wells, utilities, and significant site features including buildings and property lines were determined by a professional survey with a horizontal control accuracy of ± 1.0 feet, and a vertical accuracy of ± 0.01 foot. Elevation data was referenced to a local USGS datum in feet above MSL. Monitoring well/soil boring location data was referenced to the Wisconsin State Plane Coordinate System.
- 4.6 Soil and Groundwater Waste Handling. All decontamination water, monitoring well development water, and purge water generated during the investigation procedures was containerized in 55-gallon Department of Transportation (DOT) approved drums. All water was transported to National Tank Service for disposal.

The auger soil cuttings generated during drilling procedures were containerized in 55-gallon DOT approved drums. All auger spoils were staged on-site pending proper disposal.

5. INVESTIGATION RESULTS

Geology beneath the site was characterized during the drilling activities. The hydrogeology, including horizontal direction of shallow groundwater flow and horizontal hydraulic gradient, was determined from water-level measurements completed during the field and data collection activities. Soil and groundwater quality beneath the site were evaluated based on the results of field screening measurements and analytical results of soil and groundwater samples. The following is a discussion of the site-specific physical and chemical characteristics of the soil and groundwater.

5.1 Site-Specific Subsurface Characteristics.

5.1.1 <u>Site Geology.</u> The subsurface soil observed during drilling activities is comprised primarily of silty sand with interbedded gravel, silt, or clay seams. The sand unit extends from the ground surface to approximately 36 feet bgs, the maximum depth of drilling. The specific soil characteristics and depths encountered during drilling activities are shown on the soil boring log forms (Appendix B) and depicted on the geologic cross sections presented on Figure 3.

5.1.2 <u>Site Hydrogeology.</u> Static water levels were measured in the groundwater monitoring wells to determine the horizontal direction of shallow groundwater flow and horizontal hydraulic gradient beneath the site. To date, three rounds of static water-level measurements have been completed; depth to groundwater ranges between 20.55 feet bgs in MW-5 and 31.36 feet bgs in MW-4 for the February 9, 2000 monitoring event. The measured water-level interface is coincident with the sand unit observed during drilling activities.

Based on the static water-level elevations, the groundwater flow direction was determined to be toward the northwest. The horizontal hydraulic gradient was calculated to be approximately 0.064 feet per foot for the February 2000 monitoring event. Groundwater elevations are presented in Table 1. Calculations for the horizontal hydraulic gradient are provided in Appendix F. The groundwater contour map for the February 2000 monitoring event is presented as Figure 4.

Hydraulic conductivity values were previously determined for the site by completing a pump test as part of a separate investigation. Based on the results of the pump test, the estimated hydraulic conductivity value for the site is 3.3×10^{-4} centimeters per second (cm/sec). The measured hydraulic conductivity is consistent with the typical range reported for sand.

The average linear groundwater flow velocity for the formation is determined by the formula:

$$V = \frac{KI}{n_e}$$

Where:

V = groundwater flow velocity (ft/day)

n_e = effective porosity (%)

K = hydraulic conductivity (ft/day)

I = average hydraulic gradient (ft/ft) (Freeze and Cherry, 1989)

Calculated average groundwater linear velocity (using the measured estimated hydraulic conductivity value, calculated horizontal gradient, and an assumed porosity of 0.3 for sand) for the site is 0.2 feet per day (ft/day) [or 72.8 feet per year (ft/yr)].

- 5.2 Soil and Groundwater Quality. Field screening and laboratory analytical data collected during the investigation were used to evaluate soil and groundwater conditions beneath the site and to determine the potential impacts to the environment resulting from the storage and distribution of petroleum hydrocarbon products. The following is a discussion of the laboratory analytical results for soil and groundwater samples, and how the concentrations of residual petroleum hydrocarbons detected in the soil and groundwater media compare to applicable Chapter NR 720 Generic Residual Contaminant Levels (RCLs) and Chapter NR 140 Groundwater Quality Standards.
 - 5.2.1 Soil Quality Results. A review of the soil quality results indicates that three (GP-5, MW-2, and MW-4) of the nine soil borings sampled contained GRO, DRO, Lead, and PVOC concentrations below the Chapter NR720 Soil Cleanup Standards and/or Residual Contaminant Levels (RCLs). PAHs were also reported below the Interim Guidance Cleanup Levels for soil borings GP-5, MW-2, and MW-4. Soil samples collected from soil borings GP-1 through GP-4, GP-6, and MW-1 contained NR 720 exceedances for GRO, DRO, and/or PVOC constituents. **GRO** exceedances ranged from 189 milligrams per kilogram (mg/kg) in MW-1 (2-4 feet bgs) to 8,310 mg/kg in GP-4 (9-12 feet bgs). DRO exceedances ranged from 253 mg/kg in GP-6 (0-2 feet bgs) to 28,200 mg/kg in MW-1 (26-28 feet bgs). PVOC constituents above NR 720 Soil Cleanup Standards were reported in samples collected within six feet below ground surface, specifically in soil borings GP-1 (0-2 feet bgs), GP-3 (3-6 feet bgs), GP-4 (0-3 feet bgs), GP-6 (0-2 feet bgs), and MW-1 (2-4 feet bgs). Soil impacts above applicable standards appear to be confined to within the top four feet of ground surface and the groundwater interface in the immediate vicinity of the former/existing AST systems. Shallow impacts were also reported in the immediate vicinity of the former UST location. Soil quality results are summarized on Table 2 and presented on Figure 5; associated soil laboratory reports are provided as Appendix G.

- 5.2.2 Soil Biofeasibility Results. One soil sample was collected from soil boring GP-1, GP-4, and GP-5 to obtain initial screening information used to determine if intrinsic bioremediation of residual petroleum impacts to soil is feasible and on-going. The carbon to nitrogen (C:N) ratio indicates that nitrogen is available in the subsurface in concentrations recommended for effective rates of biodegradation. Specifically, the C:N ratio in GP-1 (2-4 ft bgs) and GP-5 (3-5 ft bgs) are 8.2 and 7.5, respectively. The carbon to phosphorous (C:P) ratio suggests that phosphorous appears to be limited in quantity because the C:P ratio is higher than the range (<120 for C:P) recommended for effective rates of biodegradation. An analysis of groundwater biofeasibility results is presented in Section 5.2.4. Soil biofeasibility results are presented in Table 3.
- 5.2.3 Groundwater Quality Results. To date, three rounds of groundwater monitoring were completed: November 1999, February 2000, and May 2000. Groundwater samples were collected from the monitoring well network for laboratory analysis of at least one of the following: VOC, PAH, PVOC plus 1,2 DCA, and Lead. VOC concentrations were reported below NR 140 Preventive Action Limits (PALs) throughout the sampling program in monitoring wells MW-2, MW-3, and MW-4. Methyl Tert Butyl Ether, Benzene, and 1,2-Dichloroethane were reported above PALs in monitoring well MW-5 in the most recent sampling event (May 2000) at concentrations of 32 micrograms per liter ($\mu g/I$), 2.7 $\mu g/I$, and 2.7 $\mu g/I$, respectively. Benzene was reported at 0.6 μ g/l, slightly above NR 140 PALs, and 1,2-Dichloroethane was reported at 6.6 μ g/l, slightly above NR 140 Enforcement Standards (ESs), in monitoring well MW-1 in the May 2000 sampling event. The slight VOC concentrations reported in MW-1 and MW-5 were not observed in down gradient monitoring wells MW-2 and MW-4 indicating that off-site migration of groundwater impacts is not occurring. Groundwater analytical results for the monitoring wells are summarized in Table 4 and depicted on Figure 6. Groundwater laboratory analytical results and associated chain-of-custody are presented as Appendix H.
- 5.2.4 <u>Groundwater Biofeasibility Analysis</u>. Groundwater samples were collected from the monitoring well network for laboratory biofeasibility analysis during the all groundwater sampling events. In situ analysis during each

monitoring event were also completed on the monitoring well network to further evaluate if intrinsic bioremediation of hydrocarbon impacts to groundwater is feasible and on-going.

A review of the nutrient data obtained for the groundwater indicates subsurface conditions are favorable for intrinsic bioremediation. Dissolved oxygen and nitrate concentrations are relatively lower in the impacted monitoring wells indicating microbe consumption during the biodegradation process. Soluble manganese is present in the groundwater at relatively low concentrations suggesting the reduction of Mn⁺⁴ is currently not occurring at appreciable rates. Additionally, methane concentrations reported for the first sampling event indicate methanogenesis is occurring in impacted monitoring wells MW-1 and MW-5 at relatively higher rates than the other monitoring wells.

In situ field measurements of pH are within the range (6 to 8) recommended for effective rates of bioremediation. Redox measurements are relatively lower and ferrous iron concentrations are relatively higher in the impacted monitoring wells providing further evidence that natural attenuation is occurring at the site. In general, it appears that the groundwater biofeasiblity results are indicative of conditions favorable for effective rates of intrinsic bioremediation. Table 4 presents a summary of the in situ geochemical results for groundwater. Associated laboratory reports are provided in Appendix H.

5.3 Contaminant Mass Calculation. The estimated GRO/DRO contaminant mass in soil was calculated using the formula:

$$\textit{Mass(lb)} = A*T*U*\frac{X}{1E-06}$$

Where:

U = Dry Unit Weight of Soil (lb/ft³)

X = Geometric Mean of GRO/DRO Concentration (ug/kg)

Soil impacts in both the unsaturated and saturated zones were used for the calculation. The estimated mass of GRO impacts in the subsurface soil is approximately 3,700 pounds; the estimated mass of DRO impacts in the subsurface soil is approximately 41,700 pounds. Due to the minimal extent and concentrations of groundwater impacts, the groundwater contaminant mass is deemed negligible. The total GRO/DRO contaminant mass in the subsurface, therefore, is approximately 45,400 pounds. Figure 5 depicts the soil contaminant mass area.

As stated earlier, approximately 800 tons of soil were excavated during AST removal activities and stockpiled on-site pending proper disposal. The 800 tons were removed from the former AST area located on the 728 Clarendon Avenue property and from the footprint of the existing concrete slab located on the 728 Clarendon Avenue and 502 Oakland Avenue properties. The excavation extended to a depth of approximately four feet bgs beneath the former AST area and approximately one foot bgs beneath the existing concrete slab footprint. Therefore, it is estimated that approximately 3,358 pounds, or 7.8%, of the GRO/DRO contaminant mass were removed during AST system decommissioning and replacement activities. Approximately 39,704 pounds of contaminant mass remain at the site. Table 5 summarizes the contaminant mass calculations.

6. EVALUATION OF §. COMM 46.06 RISK SCREENING CRITERIA

In accordance with §. COMM 46.06, the following risk criteria (and how each apply to the site) shall be used to determine whether the site may be closed as provided in §. COMM 46.07:

- a) None of the following environmental factors are present at the site:
 - 1. Documented expansion of plume margin. (<u>Due to the low concentrations reported at the site and the absence of PVOC impacts in down gradient monitoring wells MW-2 and MW-4, the plume margin appears to be stable/decreasing).</u>
 - 2. Verified contaminant concentration in a private or public potable well that attains or exceeds the preventive action limit. (Well

construction reports, obtained from the WGNHS, indicate that one private well constructed after 1936 is documented within 1,000 feet of the site. The residential property to the west of the site (across Clarendon Ave.) had a documented private well at one time. The private well is likely no longer in use as residents of Mukwonago receive drinking water from the municipal supply. In addition, the well constructor report indicates a low permeable clay layer exists between 35 and 80 feet bgs, thereby limiting the likelihood of petroleum hydrocarbons impacting the deeper aquifer).

- 3. Contamination within bedrock or within 1 meter of bedrock.

 (Bedrock has not been encountered beneath the property).
- 4. Petroleum product that is not in dissolved phase is present with a thickness of 0.01 feet or more, and has been verified by more than one sampling event. (Petroleum product has not been detected in the monitoring well network currently at the property).
- 5. Documented contamination discharges to a surface water or wetland. (The closest surface water bodies include an unnamed lake, Lower Phantom Lake, and Mukwonago River at locations approximately 1,500 feet northeast, 5,000 feet southeast, and 6,000 feet south of the site, respectively. Contaminant discharge from the site is highly improbable due to nominal concentrations of dissolved PVOCs remaining at the site and large lateral distance to the surface waters).
- b) No soil contamination is present at the site that exceeds any of the soil screening levels in COMM 46.06 Table 1. (Soil quality data indicates that COMM 46.06 soil screening levels were exceeded in GP-1 and MW-1 for Naphthalene. Naphthalene concentrations reported for GP-1 (24-26 ft bgs) and MW-1 (26-28 ft bgs) are 5,760 ug/kg and 16,500 ug/kg, respectively).
- c) There is no soil contamination within 4 feet of the ground surface that exceeds any of the direct contact soil contaminant concentrations for the

substances listed in COMM 46.06 Table 2. (Based on the soil quality data, petroleum hydrocarbon impacts above Table 46.05 values are present within four feet of the ground surface in soil boring GP-1 (0-2 ft bgs. Benzene concentrations were reported at 3,720 ug/kg).

- d) For substances not listed in Table 2 that are present within 4 feet of the ground surface and have been approved by the agency with administrative authority for the site as contaminants of concern as defined in §. NR 720.03 (2), any potential human health risk from direct contact has been addressed. (Various constituents of concern identified in §.NR 720.03 (2) have been detected within four feet of ground surface at concentrations which would pose a direct contact threat. For example, GRO exceedances range from 189 mg/kg to 3,490 mg/kg and DRO exceedances range from 253 mg/kg to 25,900 mg/kg within the top four feet of ground surface).
- e) If there are petroleum-product contaminants in soil or groundwater, the most recent release that caused or contributed to the contamination is more than 10 years old. (Impacted soil associated with the current investigation was first reported in January 1994, August 1993,a nd February 1999 for the 726 Clarendon Avenue, 728 Clarendon Avenue, and 502 Oakland Avenue sites, respectively. No releases have been documented from the above systems since the initial reporting date indicating the release may likely have occurred more than seven years ago for the 726 Clarendon Avenue site, six years ago for the 728 Clarendon Avenue site, and two years ago for the 502 Oakland Avenue site).
- There is no evidence of migration of petroleum product contamination within a utility corridor or within a permeable material or soil along which vapors, free product or contaminated water may flow. (Depth to groundwater (approximately 20 to 30 feet bgs) at the site is significantly deeper than typical utility depths. Direction of groundwater flow was determined to be predominantly toward the northeast. Monitoring wells MW-2 and MW-4 are located down gradient from the source area and up gradient from the utility lines. Groundwater impacts were reported below applicable standards in both monitoring wells, further supporting that the

utilities are not at risk of receiving impacted groundwater from the Horn Oil release).

- There is no evidence of migration or imminent migration of petroleum product contamination to building foundation drain tile, sumps or other points of entry into a basement or other enclosed structure where petroleum vapors could collect and create odors or an adverse impact on indoor air quality or where the contaminants may pose an explosion hazard. (Depth to groundwater (approximately 20 to 30 feet bgs) is significantly deeper than utility corridors. Additionally, groundwater impacts reported at the site are present at relatively low concentrations; therefore, risk to migration of petroleum product to a building foundation drain tile, sumps, or other points of entry into a basement is minimal. Additionally, there are no buildings present in the immediate area of the AST system or former UST location).
- (h) No enforcement standard is attained or exceeded in any groundwater within 1000 feet of a well operated by a public utility, as defined in §. 196.01 (5), or within 100 feet of any other well used to provide water for human consumption. (See (a) 2 above).

All current Emergency Rule and proposed §. COMM 46.06 risk criteria have been evaluated and satisfied for this site except for items b), c), and d). Due to the presence of soil impacts within four feet of ground surface and Table 1 soil exceedances, remedial options need to be evaluated and remedial action implemented at the site to obtain closure status for the project.

7. SUMMARY

The following is a summary of the geologic, hydrogeologic, and analytical data obtained from the Horn Oil property located at 728 Clarendon, Mukwonago, Wisconsin.

 The area of investigation encompasses three separate releases reported on August 5, 1993, January 20, 1994 and May 7, 1999, and February 26, 1999. The release areas correspond to three different addresses previously owned by Wisconsin Central Limited Railroad but now owned by the Horn Oil Company.

- The subsurface soil observed during drilling activities is comprised primarily of silty sand with some gravel or silt seams. The sand unit extends from the ground surface to approximately 32 feet bgs, the maximum depth of drilling.
- o Based on the static water-level elevations, the groundwater flow direction was determined to be toward the northwest. The horizontal hydraulic gradient was calculated to be approximately 0.064 feet per foot for the February 2000 monitoring event. Based on the results of the pump test, the estimated hydraulic conductivity value for the site is 3.3x10⁻⁴ cm/sec; calculated average groundwater linear velocity for the site is 0.2 ft/day.
- A total of 11 soil borings (Geoprobe™ and hollow stem auger) were completed on the Horn Oil property. Soil samples collected from six soil borings contained NR 720 exceedances for GRO and/or DRO constituents. PVOC compounds were reported above NR 720 RCLs in three soil borings. Four soil borings contained PAH constituents above the Interim Guidance Cleanup Levels for Groundwater Pathways. Soil impacts above applicable standards appear to be confined to within the top four feet of ground surface and the groundwater interface in the immediate vicinity of the former/existing AST systems. Shallow impacts were also reported in the immediate vicinity of the former UST location.
- All of the hollow stem auger soil borings were completed as monitoring wells MW-1 through MW-5. VOC concentrations were reported below PALs throughout the sampling program in monitoring wells MW-2, MW-3, and MW-4. Methyl Tert Butyl Ether, Benzene, and 1,2-Dichloroethane were reported above PALs but below ESs in monitoring well MW-5 in the most recent sampling event (May 2000). Benzene was reported slightly above NR 140 PALs and 1,2-Dichloroethane was reported at slightly above NR 140 ESs in monitoring well MW-1 in the May 2000 sampling event. The slight VOC concentrations reported in MW-1 and MW-5 were not observed in down gradient monitoring wells MW-2 and MW-4 indicating that off-site migration of groundwater impacts is not occurring.

- Due to 1) the shallow depth of utilities relative to the large depth to water, 2) low levels of groundwater concentrations, and 3) groundwater quality data in down gradient monitoring wells MW-2 and MW-4, it is Sigma's opinion that the utilities are not at significant risk for the preferential migration of impacted groundwater associated with the Horn Oil release.
- A review of the nutrient data obtained for the groundwater indicates subsurface conditions are favorable for intrinsic bioremediation. Dissolved oxygen and nitrate concentrations in groundwater are relatively lower in the impacted monitoring wells indicating microbe consumption during the biodegradation process. Soluble manganese is present in the groundwater at relatively low concentrations suggesting the reduction of Mn⁺⁴ is currently not occurring at appreciable rates. Additionally, methane concentrations reported for the first groundwater sampling event indicate methanogenesis is occurring in impacted monitoring wells MW-1 and MW-5 at relatively higher rates than the other monitoring wells. The carbon to nitrogen (C:N) ratio indicates that nitrogen is available in the soil in concentrations recommended for effective rates of biodegradation.
- The estimated mass of GRO impacts in the subsurface soil is approximately 3,700 pounds; the estimated mass of DRO impacts in the subsurface soil is approximately 41,700 pounds. Due to the minimal extent and concentrations of groundwater impacts, the groundwater contaminant mass is deemed negligible. The total GRO/DRO contaminant mass in the subsurface, therefore, is approximately 45,400 pounds.

Approximately 800 tons of impacted soil were removed in association with AST system replacement activities. It is estimated that approximately 3,358 pounds, or 7.8%, of the GRO/DRO contaminant mass were removed during AST system replacement activities. Approximately 39,704 pounds of contaminant mass remain at the site.

Based on the soil and groundwater quality data collected, two separate petroleum releases have occurred. One release from the combined AST system located at 502 Oakland Avenue and 728 Clarendon Avenue and one from the UST system located at 726 Clarendon Avenue. The shallow impacts (significantly above the water table interface) in the former UST area confirm the separate release. Additionally, the lack of detected petroleum compounds in the former UST further indicates the two impact areas are not commingled.

8. RECOMMENDATIONS

Due to the elevated detected concentrations of petroleum hydrocarbons in the soil and ES exceedances in monitoring well MW-1, the implementation of a remediation strategy is warranted to restore subsurface conditions to acceptable levels as determined by the WDNR and COMM. Therefore, Sigma recommends the completion of a remedial action plan analysis that meets the requirements of Chapter NR 722 and COMM 47 and submittal of the analysis to the respective state agencies for approval.

9. LIMITATIONS OF INVESTIGATION

This report was prepared under constraints of cost, time, and scope, and reflects a limited assessment and evaluation rather than a full, total, complete or extensive assessment and evaluation.

Our assessment was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by professional consultants practicing in this or similar localities. No other warranty or guarantee, expressed or implied, is made as to the conclusions and professional advice included in this report.

The findings of this report are valid as of the present date of the assessment. However, changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation, from the broadening of knowledge, or from other reasons. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control.

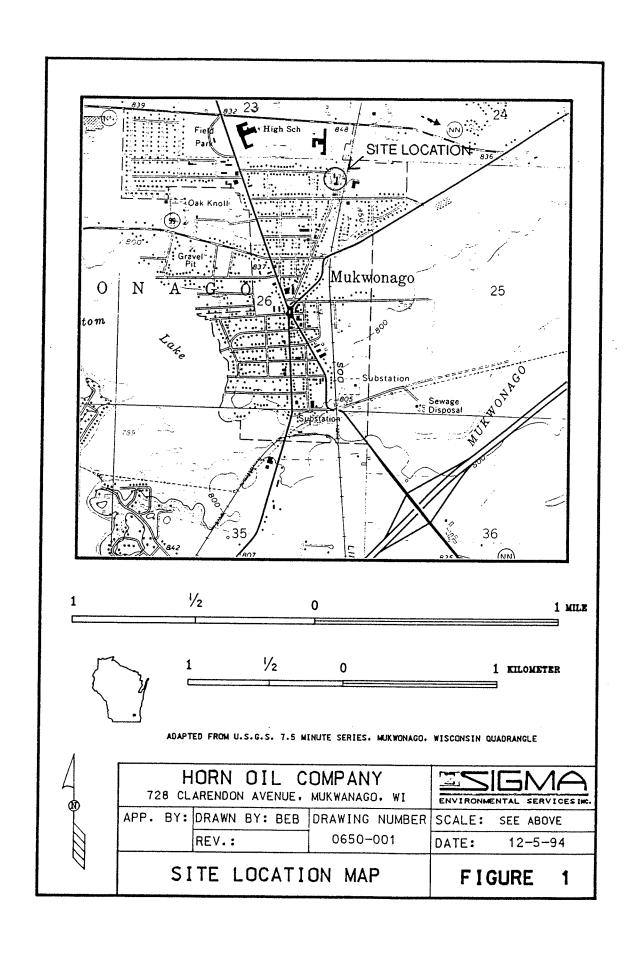
The interpretations and conclusions contained in this report are based upon the result of independent laboratory tests and analysis intended to detect the presence and/or concentrations of certain chemical constituents in samples taken from the subject property. Sigma Environmental Services, Inc. has no control over such testing and analysis and therefore, disclaims any responsibility for any errors and omissions arising therefrom.

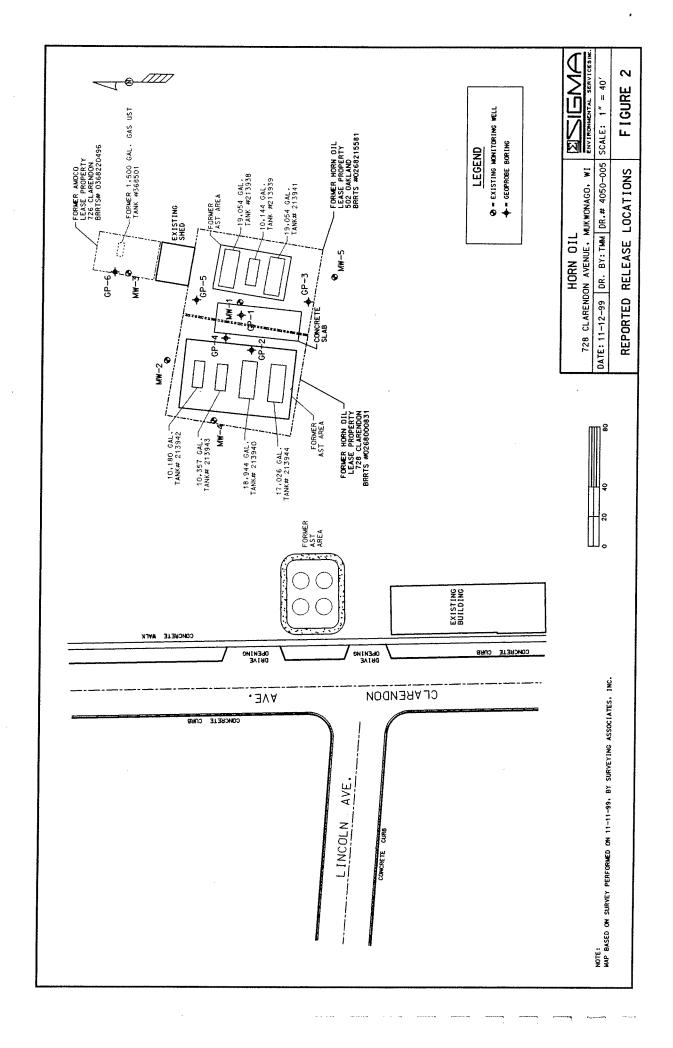
A subsurface exploration was performed and presented in this report. However, subsurface exploration cannot totally reveal what is below the surface. Depending upon the sampling method and frequency, every soil condition may not be observed, and some materials or layers which are present in the subsurface may not be noted.

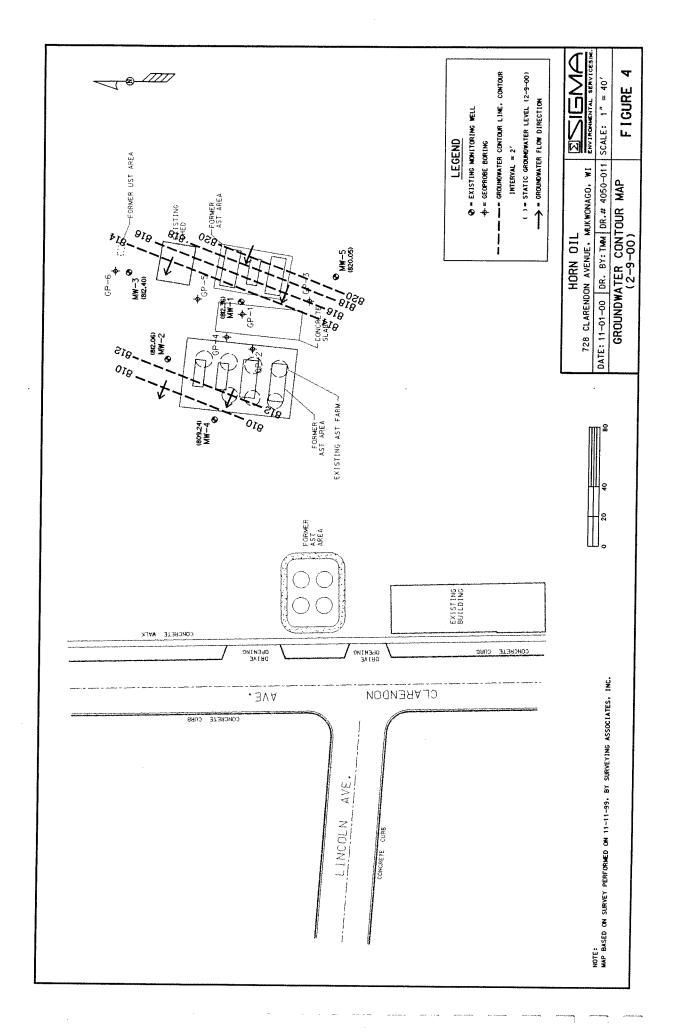
This report is issued with the understanding that it is the responsibility of the owner(s) to ensure that the information and recommendations contained herein are brought to the attention of the appropriate regulatory agency(ies).

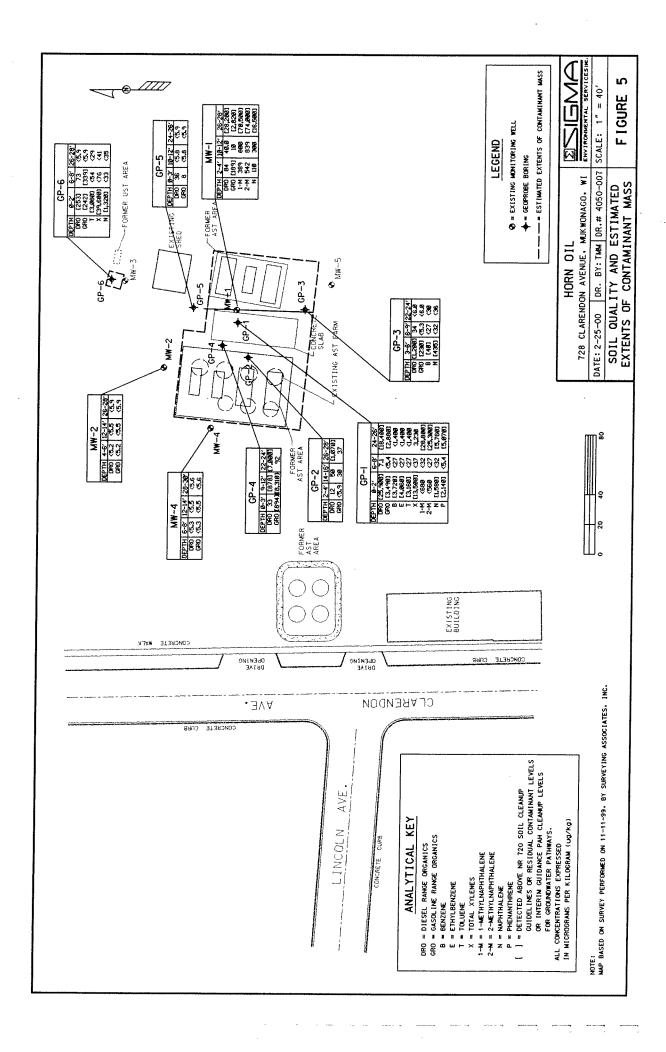
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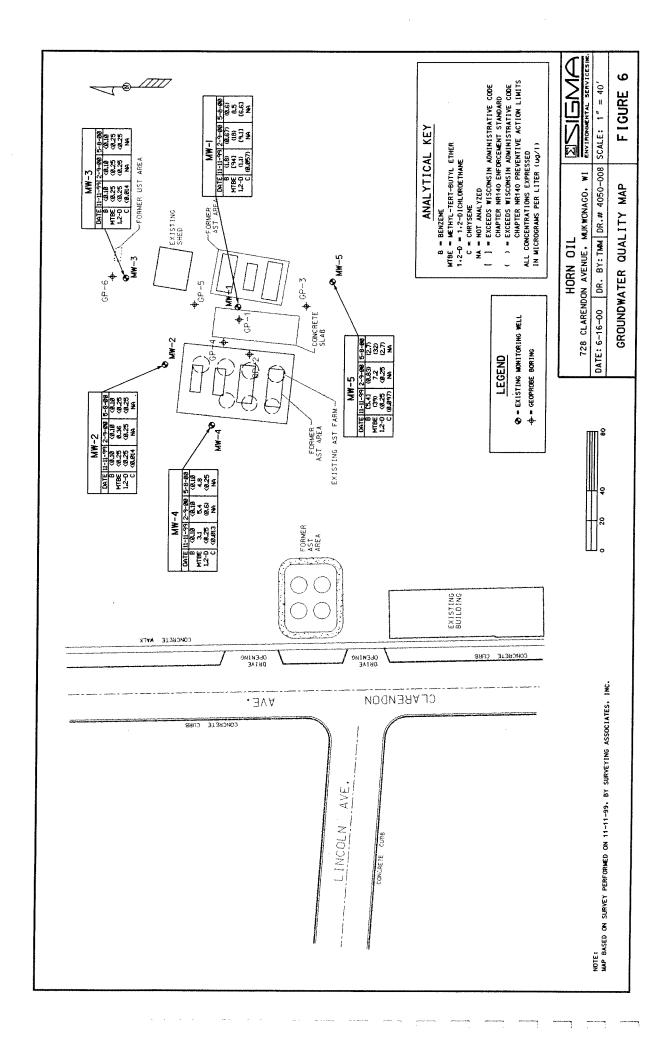


Table 1 Groundwater Elevations Horn Oil

Mukwonago, Wisconsin

Monitoring Well	Elevation of Ground Surface	Elevation of Top of Casing	Depth to Groundwater from Top of Casing	Depth to Groundwater from Ground Surface	Groundwater Elevation	Date
MW-1	839.98	839.53	26.3	26.75	813.23	11/11/99
			27.17	27.62	812.36	02/09/00
MW-2	840.02	839.76	26.95	27.21	812.81	11/11/99
			27.7	27.96	812.06	02/09/00
MW-3	839.94	839.55	26.35	26.74	813.2	11/11/99
			27.15	27.54	812.4	02/09/00
MW-4	840.6	840.18	29.98	30.4	810.2	11/11/99
•		-	30.94	31.36	809.24	02/09/00
MW-5	840.97	840.39	18.87	19.29	821.31	11/11/99
		-	20.13	20.55	820.05	02/09/00

Elevations taken relative to mean sea level.

Sigma Environmental Services, Inc.

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Hom Oil Mukwonago, Wisconsin

mg/kg	26' 2-4'	L										NR /20 308
Range Organics mg/kg 5.9 7.7 5.5		14-16 26-28	3-6.		22-24'	P-3.	9-12,	22-24	0-3,	10-12	24-26	Cleanup Levels
Fange Organics mg/kg 3,490 7,1 13,400 1,400 1,400 1,400 1,3400 1,540 1,5400 1,400 1,3		9.3		9.4	9	28	9.1	6.8	13	9.3	10	500
Range Organics mg/kg 3,490 c5.4 2,880 c1.00 c1.00 c1.00 c1.00 c1.00 c27 c1.400 c1.00 c1.00 c27 c1.400 c1.00 c27 c1.400 c1.00 c27 c1.400 c1.00 c1.00 c27 c1.400 c1.00 c27 c1.400 c1.00 c1.00 c27 c1.400 c27 c2.400 c27 c2.00 c2.00 c27 c2.00 c2.00	12	50 1,070	0 1,200	34	<6.0	33	878	7,000	36	<5.8	<5.9	100
Compounds Comp	180 <5.9	H	20	<5.3	<6.0	894	8,310	92	8	<5.8	<5.9	100
Controctance				ı,				- 0				
National 400 <30	_		<27	<30	43	<289	<29	<28	<29	<29	5.5	
Teacher Langing 1,000 1,400 1,400 1,400 1,1350 1,400 1,14				<27	<30	<31	<289	<29	<28	<29	<29	4.9
Fert Buty Ether				<27	<30	31	<289	<29	<28	<29	<29	2900
methylbenzene ug/kg 3,180 <27 <1400 methylbenzene ug/kg 3,3800 <27 3,4600 methylbenzene ug/kg 13,600 <27 5,880 matic Hydrocarbons:				427	<30	31	<289	<29	<28	<29	<29	**
Markin/lenzene Ug/kg 33,800 <27 34,600	400 <30	<28 <60	30	<27	<30	<31	<289	<29	37	<29	<29	1500
Delication	7		_	36	<30	20	<289	<29	06	<29	<29	*#
Ug/kg 113,500 13,230 13,230 14,250 14,100 1	X		_	<27	<30	<31	<289	¢29	4	<29	<29	1
ug/kg <1,100 <54 <580 ug/kg <1,900	30 42			<37	<42	48	<404	<40	135	<u>c4</u> 1	c41	4100
ug/kg <1,100												Interim Guidance
ug/kg <1,100 <54 <580 ug/kg <1,300 <91 <860 ug/kg <1,100 <54 <86 ug/kg 1,120 <5.4 <58 ne ug/kg 147 <54 <58 ne ug/kg 282 <5.4 <58 ug/kg 327 <5.4 <58												Cleanup Levels for PAHs
ug/kg <1,900 <91 <980			_	<53	09>	<120	<290	<280	<110	<58	T	38,000
e ug/kg <110 <5.4 334 e ug/kg 14,120 <5.4 <5.8 ne ug/kg 282 <5.4 <5.8 ne ug/kg 327 <5.4 <5.8			_	06>	<100	<200	<490	<480	<190	66>	<100	1,000
ne ug/kg 1,120 <5.4 <58 ne ug/kg 147 <5.4 <58 ne ug/kg 282 <5.4 <58 ug/kg 282 <5.4 <58				<5.3	<6.0	<12	127	37	11	<5.8	<5.9	3,000,000
ne ug/kg 147 <5.4 <58 ne ug/kg 282 <5.4 <58 ug/kg 327 <5.4 <58)		<5.5 <6.	0 110	<5.3	<6.0	65	<29	<28	7.1	<5.8	<5.9	17,000
ne ug/kg 282 <5.4 <58 ug/kg 327 <5.4 <58				<5.3	<6.0	32	<29	<28	16	<5.8	<5.9	360,000
ug/kg 327 <5.4 <58)	-			<5.3	<6.0	29	<29	<28	16	<5.8	<5.9	870,000
	58 <5.9	<5.5 <6.0		<5.3	<6.0	47	<29	<28	. 37	<5.8	<5.9	48,000
ii) Perylene ug/kg 225 <5.4 <58	-	-	-	<5.3	<6.0	29	<29	<28	35	<5.8	<5.9	6,800,000
ug/kg 180 <5.4 <58	-		-	<5.3	<6.0	28	<29	<28	26	<5.8	<5.9	37,000
inthracene ug/kg <220 <11 <120	+			<11	<12	₹	09>	<55	<22	<12	<12	38,000
iene ug/kg 981 <11 1,840	-			15	<12	110	254	9	236	<12	<12	200,000
ug/kg 2,930 <11 1,960				20	<12	<24	1,120	172	<22	<12	<12	100,000
rene ug/kg 62 <5.4 <58		-	-	<5.3	<6.0	37	<29	<28	24	<5.8	<5.9	680,000
ug/kg <680 <32 28,800			_	<32	<36	99	8,660	872	55	<35	<35	23,000
hthalene ug/kg <560 <27 25,300				<27	<30	171	<140	<140	112	<29	<29	20,000
ug/kg 1,580 <32 5,760				<32	×36	92	<180	<170	87	<35	<35	400
ithrene ug/kg 2,140 <5.4 5,070				18	<6.0	43	658	126	<11	<5.8	<5.9	1,800
<5.4 1,150	150 <5.9	_	-	6.4	<6.0	61	439	149	26	<5.8	<5.9	8,700,000

NA = Not Analyzed

BOLD

** = Detected Above NR 720 Soil Cleanup Guidelines or Residual Contaminant Levels or Interim Guidance PAH Cleanup Levels for Groundwater Pathways

** = No Standard Established

						T Ios	Table 2 Soll Quality Results	Ø						
						T a	Hom Oil Mukwonago, Wisconsir	E						
Boring ID			g-d5			MW-1			MW-2			AWA		NR 720 Soll
Depth (feet bgs)		0-5,	.8-9	26-28	2-4	10-12'	26-28"	4-6,	12-14	26-28'	6-8'	12-14	28-30	Cleanup Levels
Lead	mg/kg	209	11	<4.7	AN.	NA	NA	AN	AN	AN	AN	AN	NA	200
Diesel Range Organics	mg/kg	噩	73	<5.9	84	40.0	28,200	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	100
Gasoline Range Organics mg/kg	mg/kg	242	339	<5.9	189	10	2,820	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	100
Petroleum Volatile Organic	Compounds													
Benzene	ng/kg	<140	<54	<29	<29	<30	<588	<26	<28	<30	<27	<28	<28	5.5
1,2-Dichloroethane	ng/kg	<140	<54	<29	<29	<30	<588	<26	<28	<30	<27	<28	<28	4.9
Ethylbenzene	ug/kg	2,750	<54	<29	<29	<30	1,050	<26	<28	<30	<27	<28	<28	2900
Methyl Tert Butyl Ether	ng/kg	<140	<54	<29	<29	<30	<588	<26	<28	<30	427	<28	<28	
Toluene	ug/kg	3,080	<54	<29	38	<30	<588	<26	<28	<30	<27	<28	<28	1500
1,2,4-Trimethylbenzene	ug/kg	18,700	09	<29	767	132	32,900	<26	<28	<30	<27	<28	<28	:
1,3,5-Trimethylbenzene	ng/kg	10,200	<54	<29	330	46	8,810	<26	<28	<30	<27	<28	<28	
Xylenes	ug/kg	39,600	<76	<41	130	<42	3,640	<36	<39	<42	<37	<39	<39	4100
Polyaromatic Hydrocarbons:														Interim Guidance
														PAHs
Acenaphthene	ug/kg	<280	<55	69>	69>	09>	3,290	<52	<55	<59	<53	<55	<56	38,000
Acenaphthylene	ug/kg	<460	<93	<100	<100	<100	<1,500	<88	<94	<100	-691	\$	<95	1,000
Anthracene	ug/kg	<28	<5.5	<5.9	31	<6.0	611	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	3,000,000
Benzo (a) Anthracene	ug/kg	187	<5.5	<5.9	62	12	2,320	12	<5.5	<5.9	<5.3	<5.5	<5.6	17,000
Benzo (b) Fluoranthene	ug/kg	100	<5.5	<5.9	<5.9	<6.0	<88	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	360,000
Benzo (k) Fluoranthene	ug/kg	54	<5.5	<5.9	<5.9	<6.0	<88	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	870,000
Benzo (a) Pyrene	ug/kg	58	<5.5	<5.9	<5.9	<6.0	<88>	<5,2	<5.5	<5.9	<5.3	<5.5	<5.6	48,000 8.8
Benzo (ghi) Perylene	ug/kg	62	<5.5	<5.9	<5.9	<6.0	<88>	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	10
Chrysene	ug/kg	28	<5.5	<5.9	62	<6.0	635	12	<5.5	<5.9	<5.3	<5.5	<5.6	37,000
Dibenzo(a,h)anthracene	ug/kg	<55	411	<12	<12	<12	<180	<10	<11	<12	<11	<11	<11	38,000
Fluoranthene	ug/kg	440	<11	<12	46	<12	5,290	<10	<11	<12	<11	<11	-11	200,000
Fluorene	ug/kg	62	×11	<12	35	30	5,760	<10	411	<12	<11	411	<11	100,000
Indeno (1, 2, 3-cd) Pyrene	ug/kg	53	<5.5	<5.9	<5.9	<6.0	<88	<5.2	<5.5	<5.9	<5.3	<6.5	<5.6	680,000
1-Methylnaphthalene	ug/kg	473	<33	<35	389	009	70,500	31	<33	<36	<32	<33	<33	23,000
2-Methylnaphthalene	ug/kg	1,210	<27	<29	542	839	74,000	<26	<28	<30	427	<28	428	20,000
Naphthalene	ug/kg	1,320	<33	<35	110	300	16,500	31	<33	<36	<32	<33	<33	400
Phenanthrene	ug/kg	198	<5.5	<5.9	93	9	10,300	<5.2	<5.5	<5.9	<5.3	<5.5	<5.6	1,800
Pyrene	ug/kg	341	<5.5	<5.9	100	43	6,230	15	<5.5	<5.9	<5.3	<5.5	<5.6	8,700,000
KEY:	NA = Not dead to AN	pobyled												
	BOLD	ged Steed	Above NR 7;	20 Soil Clear	Above NR 720 Soil Cleanup Guidelines or Residual Contaminant Levels or Interfin Guidance PAH Cleanup Levels for Groundwater Porthwavs	s or Residu	ial Contamina	ant Levels or	· InferIm Gui	dance PAH C	Seanup Leve	als for Groun	dwater Path	2/6/2
	* = No Sta	indard Establi	ished											2

Sigma Environmental Services, Inc.

TABLE 3 SUMMARY OF SOIL BIOLOGICAL RESULTS

HORN OIL

Mukwonago, Wisconsin Project Reference #4050

	GP-1	GP-4	GP-5
Units	2-4'	9-12'	3-5'
mg/kg	185	21	93
mg/kg	519	150	813
mg/kg	<2.3	<2.3	59
unitless	7.5	8.1	6.7
mg/kg	0.67	0.5	0.41
mg/kg	2710	41600	4960
none	8.2	328.3	7.5
none	4044.8	83200.0	12097.6
	mg/kg mg/kg mg/kg unitless mg/kg mg/kg	Units 2-4' mg/kg 185 mg/kg 519 mg/kg <2.3	Units 2-4' 9-12' mg/kg 185 21 mg/kg 519 150 mg/kg <2.3

KEY

mg/kg = milligrams per kilogram (ppm)

						Groun	ndwater Q	T _s	Table 4	Table 4 Groundwater Quality Results - BTEX and Detects Only	octs Only							
								Mukwons	Hom Oil Mukwonson Wienonsin									
			MW-1	The state of the s	-	MW-2	The Party of the P		MW-3			MW-4		South Section 1	MW-F	_	Chanter NR 140	140
ANALYTE	Date	11/11/99	02/08/00	05/08/00	11/11/99	02/03/00	09/08/00	11/11/99	02/09/00	06/08/00	11/11/99	02/08/00	05/08/00	11/11/89	02/08/00	OFFIDRIDO	FS	PAI
Dissolved Lead	l/6m	< 0.0012	NA	NA	< 0.0012	NA	NA	<0.0012	NA	NA	L	NA	NA	< 0.0012	NA	NA		:
Benzena	l'on	1.8	0.87	90	0.07	40.40	0.00	0.00	0.0	4.00								
Toluene	Ven	0.15	0.13	0.16	0.00	0.00	010	0.00	0 0 0	V0.10	010	0.00	<0.10	5,4	0.83	2.7	200	0.5
Ethylbenzene	NBH.	0.76	0.32	0.35	<0.25	<0.25	<0.25	<0.25	V 0 25	<0.05 <0.05	V 0.25	70.00	10.00	0.40	0.00	20.10	000,1	200
Xylenes	Ngu	-	1.3	1.3	0.32	<0.25	<0.25	< 0.25	<0.25	<0.25	<0.25	<0.25	<0.25	07.00	CO 25	V 0.25	10000	140
1,3,5 Trimethylbenzene	NBM	0.88	0.21	0.28	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.25	<0.10	<0.10	7.7	1.2	13		:
1,2,4 Trimethylbenzene	NBM	1.5	-	1.2	<0.25	<0.10	<0.10	<0.10	<0.10	<0.10	<0.25	<0.10	<0.10	7.4	0.52	2	:	:
Trimethylbenzene (Total)	hgn	2.38	1.21	1.46	<0.25	<0.20	<0.20	<0.20	<0.20	<0.20	<0.25	<0.20	<0.20	15.1	1.72	2.4	480	96
Methyl Tert Butyl Ether	NB/	94	18	8.5	<0.25	0.36	<0.25	<0.25	<0.25	<0.25	3.1	5.4	4.8	39	7.2	32	09	12
n-Propylbenzene	VBV.	0.45	NA .	NA:	<0.25	NA	ΑN.	< 0.25	NA	NA	<0.25	NA	NA	66'0	NA	NA	:	:
Manbabalana	VBM	2.0	NA .	Y.	<0.25	NA	AN	<0.25	AN	AA	<0.25	AA.	NA	2.3	NA	AN	:	:
Isopropylbenzene	Wan.	20.0	NA NA	A V	<0.25	NA NA	NA NA	<0.25	NA.	AN	<0.25	¥.	YA:	3.8	NA	AN	40	8
p-Isopropyltoluene	Nov	<0.25	NA	NA	CO 25	22	NA NA	CO.20	NA NA	A V	C0.25	Y S	NA .	0.88	NA	AN	:	:
1,2 Dichloroethane	l/on	1.1	9.10	6.6	<0.2E	-0.2E	20.02	70.25	AC 07	3007	CO.25	2 0	NA NA	200	NA	NA.	:	:
Polyaromatic Hydrocarbons						2	24.07	200	0,40	20.40	07:0	0.0	20.40	<0.05	<0.25	7.7	9	0.5
Acenaphthene	l/Br/	<0.22	NA	AN	< 0.23	NA	AN	<0.24	NA	AN	< 0.22	AM	NA	<0.23	AM	AM	:	ŀ
Acenaphthylene	l/β//	<0.55	NA	NA	<0.58	NA	AN	<0.60	NA	NA	<0.56	NA	A	<0.57	NA	AN	:	:
Anthracene	NBV	0.037	NA	NA	< 0.019	NA	AN	<0.020	NA	AN	<0.018	NA	WA	0.036	NA	ΑN	3000	900
Benzolajantiracene	1/0//	0.18	Y S	¥.	<0.018	NA	AN	< 0.019	AA	AN	<0.017	AN	NA	0.1	NA	NA	:	:
Senzo(k)fluoranthene	Man	2000	Y V	A V	V 0.048	NA.	NA.	<0.047	AN	Y.	<0.044	AN	YA:	<0.044	AA	NA	0.2	0.02
Benzo(a)pyrene	Non	<0.027	NA	NA	CO.028	AN	V V	V0.032	NA	4 2	V 0.030	A S	AN S	<0.030	¥:	AN	:	:
Benzo(ghi)perylene	NBM	<0.10	NA	AN	<0.10	NA	¥	<0.11	NA NA	V V	<0.10	V V	Z AN	00.028	NA NA	NA	2.0	20.0
Chrysene	μBη	0.057	AA	AA	< 0.014	AN	AN	<0.014	NA	ΑΝ	< 0.013	AN	MA	0.097	AN	VV	0.0	000
Dibenzo(a,h)anthracene	VBH	<0.16	NA	NA	<0.17	NA	AN	<0.17	NA	AN	<0.16	NA	A	<0.16	NA	NA		***
Fluoranthene	ng/	0.3	NA	NA	<0.10	AA	AN	<0.11	NA	NA	<0.10	AN	AM	0.38	NA	NA	400	80
Filorene	hg/l	0.42	Y.	AN	<0.030	NA	NA	<0.032	AN	NA	<0.030	AN	NA	0.089	NA	NA	400	80
1-Methylosophhalene	Way.	50.093	NA	d v	<0.087	Y .	AN	<0.090	AN.	AN	<0.085	AN	¥	<0.085	NA	AM	:	:
2-Methytnaphthalene	Non	0 0	AN	Y Y	VO.42	NA NA	AN AN	×0.44	A S	NA NA	<0.41	AN .	Y.	18	Y .	AN.	:	:
Naphthalene	/DIT	1.2	NA	NA	CO 23	AN	VN VN	VO.00	NA	X 2	V 0.61	AN Y	Y S	9.5	AN:	AA	:	:
Phenanthrene	1/0//	0.71	AN	AN	<0.015	Q N	VAN	1000	NA	NA NA	CO.024	NA.	Y Y	0.00	Y.	Ψ.	40	80
Pyrene	l/B/I	0.15	AA	AM	<0.049	NA	Ä	<0.051	NA	AN	<0.048 <0.048	NA AN	Z Z	0.00	AN AN	4 42	250	: 6
in Situ Measurements:																-	200	
Dissolved Oxygen	mg/l.	0.36	0.19	NA	1.8	-	NA	1.16	1.6	NA	0.43	1.5	NA	0.41	1.3	0.17	:	:
Redox	È	92.3	32.6	2.4	453.4	210.6	217.5	420	198.1	211.7	400	270.3	212.5	33.3	166.4	-41.3	:	:
Ferrous Iron	puou l		1.2	NA S			AN C	1	1	AN	7	7	NA	7	7	NA	:	•
Temperature	0	10.7	11.3	NA	104	0 0	2 4	90.	000	0 3	0	0	0	8	0	5.6	:	:
Nutrient Panel:					100	200	VA.	0.0	0.0	NA	11.5	87.1	NA.	-		AM	:	:
N-Nitrate	l/Br/	<0.055	< 0.055	<0.20	38	12	6.8	112	31	41	1.2	<0.055	0.36	<0.055	1.5	2.5	:	ŀ
Suffate	1/8/	20	11	21	57	72	62	72	54	58	89	.18	72	31	29	18		:
Manganese, Dissolved	VB/I	0.43	0.2	0.22	0.081	0.024	0.021	0.27	0.048	0.024	0.82	0.91	0.88	0.27	0.13	0.19	:	:
Methans	/B//	1500	NA	NA	1.1	NA	NA	< 0.5	NA	NA	1.4	NA	NA	2300	NA	AN A	:	:
	ES PAL bold bold	Wiscons Wiscons Exceeds	sin Adminis sin Adminis Wisconsin Wisconsin	Wisconsin Administrative Code, Wisconsin Administrative Code, Exceeds Wisconsin Administration Exceeds Wisconsin Administrations Administration Administrati	Wisconsin Administrative Code, Chapter NR 140 Enforcement Standard Wisconsin Administrative Code, Chapter NR 140 Preventive Action Limit Exceeds Wisconsin Administrative Code Chapter NR 140 Enforcement Standard Exceeds Wisconsin Administrative Code Chapter NR 140 Preventive Action Limits	Chapter NR 140 Enforcement Standard Chapter NR 140 Preventive Action Limi ve Code Chapter NR 140 Enforcement S ve Code Chapter NR 140 Preventive Act	cement Startive Action 40 Enforcen 40 Preventive	nderd I Limit Ient Stander e Action Lin	d nits									
-	mg/L m/	 No Standard Established Miligrams per liter Malivoffs 	dard Estab per liter	#ished														
	Ú	= Celstus																

TABLE 5

CONTAMINANT MASS CALCULATIONS

HORN OIL

Calculation of Pre-Excavation Contaminant Mass In Soil

Soil Unit Weight =

Ib/ft3

100

	C	Dimensions of Soil Im		Soil Mas	SS	
	L	w	t	Vol (ft3)	lb	Kg
Ler	ngth (ft)	Width (ft)	Thickness (ft)	(L*w*t)	(vol*unit wt.)	(lb/2.2)
	110	80	6	52,800	5,280,000	2,400,000
	10	10	8	800	80,000	36,364
	10	10	3	300	30,000	13,636
	110	60	8	52,800	5,280,000	2,400,000

Average GRO and DRO Concentrations at Site:

	Concentrations		Mass of Contamir	iant
		(MASS	OF IMPACTED SO	DIL *CONC.)
Parameter	(ug/Kg)	(mg)	(Kg)	(lb)
GRO (Area 1)	240,238	576,570,159	576.57	1,268.45
GRO (Area 2)	286,423	10,415,373	10.42	22.91
GRO (Area 3)	. 8,310,000	113,318,182	. 113.32	249.30
GRO (Area 4)	407,763	978,631,135	978.63	2,152.99
N	lass of GRO in Soil =	1,678,934,849	1,678.93	3,693.66

	Concentrations		Mass of Contamir	iant
		(MASS	OF IMPACTED SO	DIL *CONC.)
Parameter	(ug/Kg)	(mg)	(Kg)	(lb)
DRO (Area 1)	252,866	606,879,319	606.88	1,335.13
DRO (Area 2)	135,901	4,941,844	4.94	10.87
DRO (Area 3)	878,000	11,972,727	11.97	26.34
DRO (Area 4)	7,895,637	18,949,529,399	18,949.53	41,688.96
	Mass of DRO in Soil =	19,573,323,289	19,573.32	43,061.31

Calculation of Excavated Contaminant Mass In Soil

Estimated Volume of Impacted Soil:

Soil Unit Weight =

Ib/ft3

100

	Dimensions of Soil I	mpact Area		Soil Mas	Ś
	w		Vol (ft3)	ile - Ib	Kg
Length (ft)	Width (ft)	Thickness (ft)	(L*w*t)	(vol*unit wt.)	(lb/2.2)
75	45	4	13,500	1,350,000	613,636
55	20	1	1,100	110,000	50,000

Average GRO and DRO Concentrations in Excavated Soil:

	Concentrations		Mass of Contamina	ant
		(MASS C	F IMPACTED SO	IL *CONC.)
Parameter	(ug/Kg)	(mg)	(Kg)	(lb)
GRO (former AST system)	72,626	44,566,225	44.57	98.05
GRO (existing concrete slat	3,490,000	174,500,000	174.50	383.90
DRO (former AST system)	19,900	12,211,209	12.21	26.86
DRO (existing concrete slat	25,900,000	1,295,000,000	1,295.00	2,849.00
Mass of GRO/	DRO Removed =	1,526,277,435	1,526	3,358
Mass of DRO/GRO in Soil Prio	r to Excavation =	19,573,323,289	19,573	43,061
Mass of DRO/	GRO Removed =	1,526,277,435	1,526	3,358
lass of DRO/GRO in Soil Af	ter Excavation =	18,047,045,854	18,047	39,704
Per	cent Removed =	7.80%	7.80%	7.80%

State of Depart	of Wisc tment o	onsin of Natu	ral Res	sources			oute To Solid	Waste			ız. Wa		`anka			BORI 4400-12		.og I	NFOR	RMAT Rev.	
							Waste Superi	water	esponse		ater Re her A	esourc						Page_	1	of	2_
Facilit Horr	y/Proje	ect Nan ompan	ne y		-								mit/Mo	nitorin	g Nun	iber	Borin	g Num	ber (GP-1	
•	g Drille Site En			ame an	d na	me of	crew c	hief)			-08		g Starte D / <u>9</u> D Y		08	Drilling 8 / 1 M D	6 /	99		ig Me probe	
DNR	Facility	Well)	Vo. W	I Uniq	ue V	Vell N	lo,	Commo	n Well	Name GP-1	Final		Water Feet N		Surfac	e Elev		MSL	Boreh- 2.0		ameter nches
State	_									E S	L		0 1	H	Local	Grid L	п	N	plicab	•	□ E
Count	_ 1/4 o y				on _	26	5, T	_5 N,	R	18 E DNR C	Lon County 68					Villag		s _		_Fee	t 🗆 W
Sar	Waukesha Sample												-	Villag	e of M	lukwor		Prope	rties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet				d Geole	ck Desc ogical C Major U	rigin F	or		USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1	20	push	1.0	0.0	. to	2.0	sort	ed, bla	ck, dry	<u>i</u>		sw			1157		D				Strong Odor
2	24	push	3.0	2.0	to	4.0	grav den:		derately k grayis	i trace y plastic sh brow		sc			325		М				Strong Odor
3	20	push	-4.0 -5.0	4.0	to	6.0				loose, pe YR5/3:I		GW			77.3		D				Slight Odor
4	20	push	-6.0 -7.0	6.0	to	8.0		y SAND rly sort				SM			18.5		D				No Odor
5	18	push	9.0	8.0	to	10.0	poor	y SAND rly sort		SM			16.4	-	D				No Odor		
6	20	push	-10.0 - - -11.0 - -12.0	10.0	to	12.0	mod	y SAND lerately wn (10)	dense,	grayish	1	SM			10.5		М				No Odor
l her			nat th			tion /		s form	is true	e and c	orrec Firm	t to th Sigm	ne bes na En	t of n viro	ny kna nmer	owled Ital S	ge. ervic	es, I	nc.		
OI EII a		10.01	110	4	1/	. /	4.			1					190-201				.a		

This form is authorized by Chapters 144, 147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days or

both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

State of Wisconsin
Department of Natural Resources
Boring Number GP-1

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A Rev. 5-92

Use only as an attachment to Form 4400-122.

Page ____ 2 of ____ 2

San	ple	$\overline{}$		Γ		and the second second second second	T	T	T			Soil	Prope	rties		_
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		And	oil/Rock Description I Geological Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
. 7		push	13.0		to 14.0	Silty SAND with gravel, loose, brown (10YR5/3:D)	SM			7.1		D			ť	No Odor
8		push	-14.0 -15.0 -16.0		to 16.0	Silty SAND with gravel, fine grained, loose, brown (10YR5/3:D)	SM			21.5		D).8		No Odor
9		push	17.0		to 18.0	SAND, coarse grained, loose, dry	sw			7.3		D				No Odor
10		push	18.0 -19.0 -20.0		to 20.0	SAND with gravel, coarse grained, loose, dry	sw			1.9		D				No Odor
11		push	21.0		to 22.0	6" SAND with gravel, coarse grained, loose, dry. 14" Gravelly SAND, poorly sorted, pale brown (10YR6/3:M)				4.1		М				No Odor
12	20	push	23.0	22.0	to 24.0	SAND, fine grained, loose, well sorted, moist	SP			4.4		М				No Odor
13	22	push	25.0	24.0	to 26.0	SAND, fine grained, loose, well sorted, wet @25'	SP			31.3		w				Strong Odor
_			27.0	-		End of boring					-					
			=28.0 = =29.0													
			-30.0 - -31.0													
			-32.0											1		

State o Depar	of Wisc tment c	onsin of Nati	ıral Re	source	s		oute To: Solid Waste Emergency Respons Wastewater	se 🔲 U	laz. Wa Indergi Vater R	ound '				BOR : 4400-1		LOG 1	INFOI		ΓΙΟΝ 5-92
							Superfund		ther A	STs					-	Page_		of	
	y/Proje Oil C								Licer	ise/Pei	mit/Mo	onitorii	ig Nur	nber	Borir	ig Nun	ıber (GP-2	
-	ite En	-			nd nar	ne of	crew chief)		_0		ng Start 16 / D 7		0	Drilling 8 / 1 M D	16/	99		ng Me probe	
	acility		No. V	VI Unio	que V	ell N	o. Common Wel	l Name GP-2	Final	Static	Water Feet N			ce Elev	Feet	MSL	2.0)0i	iameter nches
State I	Location Loc		1/4	ef Conti		,	,T5 N, R	E S 18 E	1	at	•	, II	Local	Grid I		N	pplicab	•	□ E t □ W
County			_ 174 C Wauke	-	ion	20	,13 N, R		Lor County 68		Civil'				ge	18			— W
San	nple		Tauke	I					00	1	\vdash	Villag	C OI IV.	lukwoi		Prope	rties		_
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet			And	oil/Rock Description I Geological Origin I Each Major Unit			uscs	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
2	24	push push	1.0 2.0 3.0		400	4.0	8" Sandy GRAV sorted, black, mo Sandy CLAY wit gravel, dense, mo plastic, black, mo Sandy CLAY wit gravel, dense, mo plastic, dark gray (10YR4/2:M)	h trace derately pist. h trace derately yish brow	y v wn	sc sc			6.5 11.5		M M			* 2	Slight Odor No Odor No Odor
4	20	push	-5.0 -6.0 -7.0 -8.0	8.0	to 1	11.0	gravel, dense, mo plastic, dark gray (10YR4/2:M) 12" Silty CLAY, brown, wet. 8" SA grained, dark yell brown (10YR4/6:	dense, h	wn ard,				10.3		M/W				No Odor
Signati	by cer)ode	Da	e info	es l	ion o	Sandy SILT with poorly sorted, denyellowish brown n this form is true	gravel, nse, light e and c	orrec Firm 220 E	Sigm Ryan	a En Road,	viron Oak C	men reek,	wledg tal So WI 53	ervic 154 (4	414) 76	58-714	4	No Odor
than \$1	0 not n	nore th	nan \$5,	000 for	r each	4, 147 viola	and 162, Wis. Stats tion. Fined not less d violation is a sepa	s. Compl than \$10	etion o	of this i	report i n \$ 100	s mand or imp	atory. risone	Penalt d not le	ties: Fo	orfeit n n 30 d	ot less		

State of Wisconsin Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT Rev. 5-92

Form 4400-122A

Boring Number GP-2 Use only as an attachment to Form 4400-122 **2** of Soil Properties Sample 8.日 Compressive Strength Depth in Feet Blow Counts Soil/Rock Description Length Att. Recovered (RQD/ Comments And Geological Origin For Moisture Content Plasticity Index Well Diagram Graphic Log PID/FID Each Major Unit Liquid Limit SC P 200 (10YR6/4:M/W) SM M/W 14.0 to 16.0 Sandy SILT with cobbles and 24.9 No Odor 24 push gravel, poorly sorted, dense, light yellowish brown (10YR6/4:M/W) 16" Rock/cobbles. 4" Silty 16.0 to 18.0 10.7 M No Odor 20 push SAND, very fine to fine grained, loose, olive yellow (2.5Y6/6:M) SM 18.0 to 20.0 10" Sandy SILT, dense, very M No Odor 20 push 6.4 fine grained, moist. 10" E_{19.0} Silty SAND, medium to coarse grained, loose, olive yellow (2.5Y6/6:M) SM Silty SAND, medium to coarse 20 push 20.0 to 22.0 2.9 M No Odor 9 grained, loose, olive yellow 21.0 (2.5Y6/6:M) SM M No Odor 22.0 to 24.0 8" Silty SAND, medium to 3.4 14 push 10 coarse grained, loose, olive yellow (2.5Y6/6:M). 6" Sandy -23.0 SILT SM M/W 24.0 to 26.0 Silty SAND, M/W 13 No Odor 11 20 push 25.0 SM w No Odor 26.0 to 28.0 Sandy SILT, wet 12 24 push 4.4 27.0 28.0 End of boring =30.0 =31.0

-32.0

State of Wisconsin Department of Natural Resources							oute T Solid Emer	Waste	□ H oonse □ U	az. Wa ndergro		`anks			BOR 1 1400-12		OG I	NFOR	RMAT Rev.	
							Wast	ewater rfund	$V \square$	Vater Retailed	sourc	es					Page_	1_	of	2
	y/Proje Oil C						Барс	Tulla	LAI			mit/Mo	nitorin	g Nun	iber	Borin	g Num	ber	GP-3	
Boring	Drille	d By (Firm n nental	ame ar	id na	me of	crew	chief)	,	_08		g Starte	99	0	Drilling 8 / 1 M D	6 /			ng Mer probe	hod
DNR I	acility	Well	No. V	VI Unio	jue V	Vell N	lo.	Common V	Well Name GP-3	Final	Static	Water Feet M			e Elev	_Feet	MSL	2.0	<u>0i</u>	ameter nches
State F	_					[, <u> </u>			E S	L		o ,	"	Local	Grid I		N	plicab		□ E
County			1/4 c		on _	26	, T _	5 N, R		Lon County 68							8 -		ree	<u> </u>
San	Waukesha 68 Sample												Villag	C OI IV	Lukwoi		Prope	rties		_
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet				d Geo	ock Descrip logical Orig Major Unit	in For		uscs	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
2		push push	-1.0 -2.0 -3.0	3.0		6.0	bla 6" sor	ck, dry			GW			237		D M	÷.			No Odor No Odor
3	24	push	-5.0 -6.0 -7.0	6.0	to	9.0	der pla bro Sar sor coa	stic, dark y own (10YR) ndy GRAV ted, mediu	6" Sandy C yellowish 4/6:M) EL, loose, p m to very d, yellowish	oorly	GW	0800 0800 0800 0800 0800 0800 0800 080		21.7		D				No Odor
4	24	push	9.0 -10.0 -11.0 -12.0	9.0	to	12.0	poo ver yell 6" wel	orly sorted, y coarse gr lowish brov SILT, very	vn (10YR5/ fine graine ght yellowis	/6:D). ed,				8.3		D/M				No Odor
		rtify t	hat th	e info	rma	tion	on th	is form is	true and	correc	t to th	ne bes	t of n	ny kno	owled	ge.	oc T	20		
Signat		Jod	<u>i U</u>	anc	lon	Uke	lde	en	l	Firm 220 E.	Ryan	Road,	Oak C	Creek,	WI 53	3154 (414) 7	68-714	4	
This fo	orm is 10 nor	aythori more t	ized by han \$5	Chapt ,000 fc	ers 1 r eac	44, 14 h viol	7 and ation.	162, Wis. 3 Fined not	Stats. Comp less than \$1	letion of	f this ore tha	report in \$100	or imp	datory. prisone	Penal	ties: F ess tha	orfeit r in 30 d	ot less ays or	}	

both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

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State of Wisconsin Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT Rev. 5-92

Form 4400-122A

Use only as an attachment to Form 4400-122. Boring Number GP-3 Page 2 of Soil Properties Sample Compressive Strength E.8 Soil/Rock Description -Blow Counts Length Att. Recovered (RQD/ Comments And Geological Origin For Moisture Content Plasticity Index Number and Type Well Diagram PID/FID Depth in Graphic Log S Each Major Unit Liquid Limit U P 200 S ML M/W No Odor 20 push 12.0 to 14.0 SILT, very fine grained, well sorted, light yellowish 13.0 brown (10YR6/4:M/W) SW D No Odor SAND, medium to coarse 20 push 14.0 to 16.0 4.6 grained, poorly sorted, silt E_{15.0} lenses, loose, pale brown (10YR6/3:D) sw 16.0 to 18.0 SAND, medium to coarse 5.7 D No Odor 20 push grained, poorly sorted, 17.0 loose, pale brown (10YR6/3:D) SM Sandy SILT, dense, hard, 4.2 M No Odor 18.0 to 20.0 20 push pale brown (10YR6/3:M) -19.0 -20.0 to 22.0 Sandy SILT, dense, hard, SM 3 M No Odor 22 push pale brown (10YR6/3:M) E-21.0 W 24 push 22.0 to 24.0 Sandy SILT, dense, hard, 3.2 No Odor pale brown (10YR6/3:W) 23.0 24.0 25.0 26.0 27.0 28.0 30.0 End of boring

State of Wisconsin Department of Natural Resources Route To: Solid Waste Emergency Res										az. Wa					BOR 1 4400-1		OG 1	NFOF	RMAT Rev.	
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	y/Proje Oil C						superrun	u .	<u>a</u> ∪			mit/Mo	nitorir	ng Nun	nber	Borin	g Num	ber	 GP-4	
Boring	g Drille lite En	d By (Firm r		nd nam	e of c	rew chie	f)	\$*************************************	08	3 / 1	g Starte 16 / _9 D Y	99	0	Drilling 8 / _1 M _ D	6 /	99	Drillin		thod
DNR.	actity	Well	No. N	VI Uni	que Wo	ell No	. Cor	mmon We	ell Name GP-4	Final	Static	Water Feet M		Surfac	ce Elev		MSL	Boreh 2.0		ameter nches
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Count			Wauke	-			1	_ II, IC_		County 68						ge			=	
Sar	nple	Г	Т	T												Soil	Prope	rties	_	
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet			And		Descriptio cal Origin jor Unit			uscs	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
3	24	push push	-1.0 -2.0 -3.0 -4.0 -5.0 -7.0 -10.0 -11.0	3.0	to 9	2.0	coal-lik gravel, 12" Sar coal-lik gravel, SAND, coarse g brown (10YR5	te debris, black, m loose, me grained, (10YR5/8 SILT, der 5/3:M)	Y, plastic trace oist. 12" edium to yellowish 3:D)	n	SM SM			23.1 8.5 138		D M				No Odor No Odor Slight Odor
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-		100	L'U				<u> </u>			220 E.	Ryan	Road,	Oak C	reek,	WI 53	154 (414) 70	58-714		
than \$1	l0 nor i	nore t	han \$5,	,000 fo	r each	violat	ion. Fin	ed not les	ss than \$10 parate offe	or mo	re tha	n \$100	or imp	orisone	d not l	ess tha	n 30 d			

State of Wisconsin
Department of Natural Resources
Boring Number GP-4

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A Rev. 5-92

Use only as an attachment to Form 4400-122.

Page ____ 2 of ____ 2

San	nple						T	T""	Г			Soil	Prope	rties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		And	oil/Rock Description I Geological Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
5	24	push	13.0	12.0	to 14.0	18" Sandy SILT, loose, yellowish brown (10YR5/4:W) 6" Sandy SILT, dense, yellowish brown (10YR5/4:W)				261		W	* 15			Strong Odor
6	24	push	-14.0 - - 15.0	14.0	to 16.0	Sandy CLAY with cobbles, dense, yellowish brown (10YR5/4:W)	sc			131		w				Strong Odor
7	20	push	16.0 17.0	16.0	to 18.0	Sandy GRAVEL, loose, poorly sorted, pale brown (10YR6/3:D)	GW			128		D				Slight Odor
8	24	push	18.0 19.0	18.0	to 20.0	SAND, medium to coarse grained, loose, well sorted, pale brown (10YR6/3:D)	SP	000		140		D				No Odor
9	20	push	21.0	20.0	to 22.0	SAND, medium to coarse grained, loose, well sorted, pale brown (10YR6/3:D)	SP			41.7		D				Slight Odor
10	20	push	22.0 -23.0	22.0	to 24.0	SAND, medium to coarse grained, loose, well sorted, pale brown (10YR6/3:D)	SP			130		D				Slight Odor
11	20	push	-24.0 -25.0	24.0	to 26.0	SAND, medium to coarse grained, loose, well sorted, pale brown (10YR6/3:W)	SP			71.1		w				Slight Odor
			-26.0 - -27.0	1.074411	ŧI	End of boring		AV-1:22								
			-28.0 -29.0													
			30.0 -31.0													
		(a - a a lil	= _32.0			NIVOVA NASARA										

State of Depart	of Wisconsin tinent of Nati	ural Re	sources	[] Eme	l Waste rgency F	Response	☐ Haz	dergro	ound T				BOR 4400-1		og i	NFOR	R MAT Rev.	
					☐ Wast ☐ Supe	tewater rfund		☐ Wa ☑ Otl			es					Page_		of	<u>2</u> .
	y/Project Nat Oil Compa								Licen	se/Per	mit/Mo	mitorir	ig Nun	nber	Borin	g Num	ber	GP-5	
Boring	Drilled By (lite Environ)	Firm n	ame and	d name o	of crew	chief)			08		g Start 1 <u>6</u> / Y		0	Drilling 8 / 1 M D	16 /	99	Drillir		thod
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County		Wauke	sha					Brace	68	Code				Iukwoi	nago				
San	nple	Г				0: 0:=									Soil	Prope	rties		
Number and Type	Length Att. & Recovered (in) Blow Counts	Depth in Feet			nd Geo	ock Dese logical (Major I	Origin Fo	or		uscs	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1	24 push	1.0	0.0	to 3.0	bla der	ick, dry. nse, har	6" San	D, loose, dy CLA yellowis	Y,				5.9		М				No Odor
2	24 push	4.0	3.0	to 5.0	der bro Gr	nse, har own (10 avelly S	d, dark YR4/6:N	ose, poo	h				4.6		D				No Odor
3	18 push	6.0	5.0	to 6.5	Sile	ty SANI se, poor	ined, dr D with g ly sorted cellow (1	ravel,	/ :D)	SM			4.5		D				No Odor
4	18 push	7.0	6.5	to 8.0	loo	se, poor	O with g ly sorted ellow (1		:D)	SM			4		D				No Odor
5	20 push	-8.0 -9.0	8.0	to 10.0	loo	se, poor) with g ly sorted cellow (1		:D)	SM		2	9.4		D				No Odor
6	24 push	-10.0 - - -11.0 - -12.0	10.0	to 12.0	Silt	y SANI		lense. 12 brownis D/M)		SM			10		D/M				No Odor
	by certify t	hat th	e infor	mation	on th	is form	is true	and co	rrect	to th	e bes	t of m	y kno	wledg	ge.	ec Ir	10		
Signati		il		tercl			<u> </u>	2	20 E.	Ryan	Road,	Oak C	reek,	WI 53	154 (4	414) 76	58-714		
This fo	rm is authori 10 nor more t	zed by han \$5,	Chapter 000 for	rs 144, 1 each vio	47 and olation.	162, W	is. Stats. not less t	Complete han \$10	tion o or mo	f this i	report i n \$100	s mand or imp	latory. risone	Penal d not l	ties: Fo	orfeit n n 30 da	ot less ays or		

both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

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State of Wisconsin Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT

Form 4400-122A

Rev. 5-92

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Use only as an attachment to Form 4400-122 Boring Number GP-5 Soil Properties Sample Compressive Strength 3.5 Depth in Feet Soil/Rock Description Blow Counts RQD/ Comments Length Att. Recovered (And Geological Origin For Moisture Content Plasticity Index Well Diagram PID/FID Graphic Log S Liquid Limit Each Major Unit USC P 200 No Odor SM 9.3 D/M Silty SAND with gravel, 12.0 to 14.0 20 push loose, brownish yellow E_{13.0} (10YR6/6:D/M) D/M No Odor Silty SAND with gravel, SM 9.7 14.0 to 16.0 20 push loose, brownish yellow -15.0 (10YR6/6:D/M) No Odor SW 9.5 D SAND with gravel, coarse to 16.0 to 18.0 20 push very coarse grained, loose, E_{17.0} poorly sorted, dry SAND with gravel, coarse to SW 9 D No Odor 18.0 to 20.0 10 20 push very coarse grained, loose, E_{19.0} poorly sorted, dry sw D No Odor 1.2 20.0 to 22.0 18 push SAND with less gravel, 11 E_{21.0} coarse to very coarse grained, loose, poorly sorted, dry D No Odor SW 22.0 to 24.0 1.1 SAND with less gravel, 12 20 push coarse to very coarse grained, loose, poorly -23.0 sorted, dry W SM 0.4 No Odor Sandy SILT, very fine 20 push 24.0 to 26.0 13 grained, wet =_{25.0} 26.0 27.0 28.0 End of boring.

State of Depart	of Wisc tment o	onsin f Natu	ıral Re	sources	S.		Emei Wast	o: I Waste rgency R tewater rfund	esponse.	Uı W	az. Wa ndergre ater Re ther <u>A</u> e	ound T esourc				BORI 4400-13		OG I		RMAT Rev. of	
Facilit	y/Proje	ct Nar	ne				Dupe	Tund		<u></u>			mit/Mo	nitorii	g Nun	nber	Borin	g Num	ber	 GP-6	
Boring	Oil Co Drille ite Env	d By (Firm n	ame ar	nd na	me of	f crew	chief)			08		g Start 17 /		0	Drilling 8 / 1 M D	7 /		Drilli		
DNR I	acility	Well	No. V	VI Unio	juć \	Vell 1	Vo.	Comm	on Well	Name GP-6	Final	Static	Water Feet N		Surfac	ce Elev		MSL	Boreh 2.0		ameter nches
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San	nple																Soil	Prope	rties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet				d Geo	ock Desc logical (Major (Origin F	or		USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1	24	push	F	0.0	to	2.0		ty SANI se, poor				SM			· 7.4		D				No Odor
2	. 24	push	1.0	2.0	to	4.0	bro	own (10	YR3/3:1	D)		SM			1.8		D	,			No Odor
			3.0				loo	se, poor YR5/3:	ly sorte		'n										
3	20	push	5.0	4.0	to	6.0	sor	avelly S ted, bro YR6/6:	wnish y		orly	sw			27.1		D				No Odor
4	20	push	-7.0	6.0	to	8.0	der	ndy SIL ise, har YR6/6:	d, brow		low	SM			31.5		D				No Odor
5	20	push	-8.0 -9.0	8.0	to	10.0	sor coa	avelly S ted, me erse grain wnish y	dium to ined, co	very bbles,	6:D)	sw			2		D				No Odor
6	20	push	-10.0 -11.0 -12.0	10.0	to	12.0	sor coa	avelly S ted, med rse grai	dium to ined, co	very bbles,	6: D)	sw			1.2		D				No Odor
		tify t	17/22/2005	e info	rma	tion	on th	is form	is true	and c	orrec	to th	e bes	t of m	y kno	wledg	je.	., Y			
Signati		765	ù	an	do	al.	علاه	don			220 E.	Ryan	Road,	Oak C	reek,	tal So WI 53	154 (4	414) 76	68-714	4	
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both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

State of Wisconsin Department of Natural Resources Boring Number GP-6

SOIL BORING LOG INFORMATION SUPPLEMENT Rev. 5-92

Form 4400-122A

Use only as an attachment to Form 4400-122.

Page **2** of _

Soil Properties Sample 3.5 Compressive Strength Depth in Feet Soil/Rock Description Blow Counts RQD/ Comments Length Att. Recovered (And Geological Origin For Plasticity Index Moisture Content Number and Type Well Diagram Graphic Log USCS PID/FID Each Major Unit Liquid Limit P 200 12.0 to 14.0 Gravelly SAND, poorly D No Odor 20 push sorted, medium to very -13.0 coarse grained, cobbles, brownish yellow (10YR6/6:D) SW Gravelly SAND, poorly 2.2 D No Odor 8 20 push 14.0 to 16.0 sorted, medium to very coarse grained, cobbles, brownish yellow (10YR6/6:D) 2.6 M No Odor 16.0 to 18.0 Silty SAND, fine to coarse 12 push grained, poorly sorted, very pale brown (10YR7/3:M) SM 18.0 to 20.0 Silty SAND, fine to coarse M No Odor 10 12 push 1.6 grained, poorly sorted, very E_{19.0} pale brown (10YR7/3:M) SM 24.7 M No Odor 20.0 to 22.0 Silty SAND with gravel, 11 24 push E_{21.0} medium to very coarse grained, poorly sorted, very pale brown (10YR7/3:M) SM M No Odor 22.0 to 24.0 Silty SAND with gravel, 1.6 24 push 12 medium to very coarse 23.0 grained, poorly sorted, very pale brown (10YR7/3:M) SM No Odor 1.5 M 20 push 24.0 to 26.0 Silty SAND with gravel, 13 medium to very coarse **_**25.0 grained, poorly sorted, very pale brown (10YR7/3:M) SM w No Odor 26.0 to 28.0 0.7 Silty SAND with gravel, 24 push 14 medium to very coarse grained, poorly sorted, very 27.0 pale brown (10YR7/3:W) **-**28. End of boring. 29.0 -30.0 -32.

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	ty/Project Oil Con										se/Per			ing Nu	nber	Born	ıg Num	iber M	W-1	
Boring	g Drilled america	By (F	irm n	ame an	d name	of crew	chief)			Date 1	Drillin	25 /	99	1	Drilling	25 /	99	Drillir		
	n and De		700000 \$550	1701818000	***************************************	X12	· C	non Well	Nome		M D	57E-5	ΥΥ	M	M D	D '	YY	Aug		ameter
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San	nple												T			Soil	Prope	rties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		A	and Geo		scription Origin F Unit	or		uscs	Graphic Log	Well	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1				0.0	to 2.0	sil	tv SAN	D w/grav	vel. blac	k.	SM	0.1	:111	26.8		D	11	4.1	Н.	Strong
	20 18 16 14 28	1 [585			ose p. s					(Odor
	'	' [-1.0																	
2	12 06	. [2.0	2.0	to 4.0	Si	lty CLA	Y w/san	d. plast	ic	SC.	1//		96.0		М				Strong
	12 06 11 09 15						,		o, panse							210				Odor
	153	Ì	3.0																	
3	14105	.	4.0	4.0	to 6.0	So.	ndy CI	LAY w/tr	Cabble	oe.	CL			3.0		D				no odor
3	14 05 09 18 22			4.0	10 0.0		ose, lt g		. Cobbi	с.,				3.0		-				Ino odor
ļ,	22	1	-5.0																	
			6.0	- (0		***					GP					,				
4	20 28 50 50 55			6.0	to 8.0	uti	ilities a	thing har ppear to	be		Gi	S		5.8		D				no odor
- 1	55		7.0					continued SAND, lo		g.										
[1		-	8.0			soi	rted, 10)yr6/2				S_0	9							
5	14 62 27 37 47		: "	8.0	to 10.0			ained, lo			ML	Ш		13.4		D				no odor
- 1	47		9.0						•			Ш								
1		ŀ												2.4						
6	20 16 26		-10.0	10.0	to 12.0		t, vf gr rted	ained, lo	ose, w.		ML	Ш		37.3		D				no odor
	26 26 40		-11.0																	
		E																		
Lhere	eby certi	fy th	-12.0 at the	e info	 rmatior	on th	nis forr	n is true	e and c	orrec	t to th	e be	st of	my kn	owled	Lae.				
Signat		, 1	<u> </u>	, (Oda	()	1011	,5 (14)	F	irm .	Sigm	a Ei	viro	nmei	ital S	ervio			4	
This fo	orta is aut	horize	ed by	Chapte	rs 144,	47 and	1 162, V	Vis. Stats							WI 53 Penal					

than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

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State of Wisconsin

SOIL BORING LOG INFORMATION SUPPLEMENT

Department of Natural Resources Form 4400-122A Rev. 5-92 Boring Number MW-1 Use only as an attachment to Form 4400-122. Page ____2 of ___ Sample Soil Properties ₹ E in Feet Compressive Strength Soil/Rock Description Blow Counts Length Att. Recovered (RQD/ Comments And Geological Origin For Moisture Content Plasticity Index Number and Type Well Diagram Graphic Log PID/FID S Each Major Unit Liquid Limit Depth i SC P 200 ML 13.0 12.0 to 14.0 Silt, vf grained, loose, D no odor well sorted 14.0 14.0 to 16.0 ML 18 Silt, vf grained, loose, 8.8 D no odor 26 48 50 well sorted 16.0 17.0 28 38 48 50 16.0 to 18.0 silty SAND, w/sorted, loose 2.0 D 14 no odor -18.0 --19.0 12 14 48 50 03 SM 10 18.0 to 20.0 silty SAND, w/sorted, loose. 2.2 D no odor E_{20.0} 14 28 38 48 58 11 20.0 to 22.0 silty SAND, w/sorted, loose. SM 3.0 D no odor 22.0 23.0 12 45 45 65 silty SAND, w/sorted, loose, W/M 12 22.0 to 24.0 1.0 no odor w/ more silt SM 13 14 40 24.0 to 26.0 silty SAND, m-c grained, p. 1.5 M no odor E-25.0 sorted 50 52 -26. 12 20 20 40 50 26.0 to 28.0 SM 523.4 W silty SAND, m-c grained, p. strong odor 14 E 27.0 sorted

SM

SM

6.9

1.6

M

W

11" silty SAND, m-c grained,

11" silty SAND, m-c grained,

p. sorted, 3" silt, vf

p. sorted, 3" silt, vf grained, w/sorted, dense.

grained, w/sorted, dense.

slight odor

no odor

15

16

14

10 17

36 72

29.0

28.0 to 30.0

30.0 to 32.0

State of Wisconsin
Department of Natural Resources
Boring Number MW-1

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A Rev 5-92

Use only as an attachment to Form 4400-122

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San	nple				T					Soil	Prope	rties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geological Origin For Each Major Unit	uscs	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content		ίλ	P 200	RQD/ Comments
			-33.0 -34.0 -35.0 -37.0 -38.0 -39.0 -41.0 -42.0 -41.0 -42.0 -44.0 -45.0 -45.0 -46.0 -47.0 -48.0 -47.0 -48.0											

	of Wisc iment c		ral Res	ources		■ Wast	Waste gency Respo ewater	onse U	ater Re	ound T	es			BOR] 4400-12				Rev.	
	y/Proje					☐ Supe	rfund	X 0		se/Pen	nit/Mo		ng Nun	ıber	Borin	Page_ g Num	ber	of	
Boring Mid-	Oil C Drille Americand I	d By (ca Dri	Firm na llers	ime an	d name	of crew	chief)	,	10	Orillin	g Starte		1	Drilling 0 / 2 M D	6 /	99	Drillir	ow St	
DNR I	acility	Well	No. W	1 Uniq	ue Well	No.	Common W	ell Name MW-2	Final	Static	Water Feet N		Surfac	e Elev		MSL	Boreh 8.5		ameter nches
State I				-	N,			E S	 La	ıt	•	11	Local	Grid I	ocatio	n (If ap N		le) ·	□ E
NE County		f <u>NE</u>	_ 1/4 o	f Section	on	26, T_	5 N, R	18 E	Lon		Civil 7	own/(City/ oi		eet 🗆	S _	-	_Fee	t 🗆 W
		V	Vaukes	ha					68					lukwor	ago	Prope	rtios		
Number and Type	Length Att. & G Recovered (in)	Blow Counts	Depth in Feet		A	and Geo	ock Descripti logical Origi Major Unit			uscs	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	ty	P 200	RQD/ Comments
1 2 3	12	13 13 13 23 25 14 13 20	-1.0 -2.0 -3.0 -4.0 -5.0 -7.0 -10.0	6.0	to 4.0 to 6.0 to 10.	gra) gra p. s) Sild 10y	ty CLAY w/ tvel 2.5y4/4 evelly SAND forted, loose ty sandy CL vr6/6. ty CLAY w/ stic, (10yr6/	, m-vf grai (10yr5/3) AY, m loos	se	CL SP CL			0		M D				no odor
I here Signat		rtify t	11	e info nde	//	on the	is form is t	rue and c	Firm :	Sigm	a En Road,	viroı Oak (n me n Creek,	owledgetal S WI 53	ervic 154 (414) 7	68-714		

This form (a) authorized by Chapters 144, 147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

State of Wisconsin
Department of Natural Resources
Boring Number MW-2

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A Rev. 5-92
Use only as an attachment to Form 4400-122. Page 2 of

Page ____ 2 of ____ 3

San	nple						T	$\overline{}$				Soil	Prope	erties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet			oil/Rock Description I Geological Origin For Each Major Unit	uscs	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
	12	1	- - 13.0		to 14.0	Sandy CLAY w/cobbles, dens hard 10r5/6.	e, SC			0.5	17411	MW				no odor __
7	20	12 16 20 30	14.0 15.0	14.0	to 16.0	Sandy CLAY w/ less sand, plasitc.	sc			0.2		w				slight odor
8	18	35 32 42 50.4	16.0 17.0	16.0	to 18.0	Sandy SILT, dense, w/tr. gravel, hard, vf-c grd.	SM			0.2		M/W				no odor
9	0	40 50-3	19.0	18.0	to 20.0	No recovery.				-	*			10.7		<u>.</u>
10	10	30 40 50-3	20.0 21.0	20.0	to 22.0	SAND, vc grained, 10yr5/4, p. sorted.	sw			0		D				no odor
11		635 50-3	22.0 -23.0	22.0	to 24.0	SAND, vc grained, 10yr5/4, p. sorted.	sw			0.3		D				no odor
12	4	36 50-4	-24.0 -25.0	24.0	to 26.0	SILT, vf grained, dense.	ML					w				no odor
13	12	38 54 50-3	26.0 27.0	26.0	to 28.0	Silty SAND, dense, f-m grained, poorly sorted 10yr5/4.	SM			0.4		w		0		no odor
14	12	33 35 23 50-5	28.0 29.0	28.0	to 30.0	Silty SAND, dense, f-m grained, poorly sorted 10yr5/4.	SM			0.1		w				no odor
15	12	32 21 20 30	30.0 -31.0	30.0	to 32.0	Silty SAND, dense, f-m grained, poorly sorted 10yr5/4.	SM			0		w				no odor
L			- 32.0				1	0.34.50	H							

State of Wisconsin
Department of Natural Resources
Boring Number MW-2

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A Rev. 5-92

Use only as an attachment to Form 4400-122.

Page ____3_ of ____3

Sample Soil Properties	1
Number and Type Length Att. & Recovered (in) Blow Counts U S C S U S C	RQD/ Comments
32.0 to 32.0 -33.0 -34.0 -35.0 -37.0 -38.0 -39.0 -40.5 -41.0 -42.0 -42.0 -43.0 -4	

State of Depar	of Wisc	onsin of Natu	ral Res	sources	☐ Wast	Waste gency Respoi ewater	nse 🔲 U	Vater R	ound T	es			BOR 4400-1				Rev.	5-92
Facilit	y/Proje	ct Nan	ie		Super	rfund	X C	ther A			anks onitorii	ıg Nur	nber	Вогіг	Page_ ng Num	l ber	of	3
	Oil C		T			ala i a fi	-	JM	406							M	W-3	
-	Ameri			ame and nam	e or crew	cmei)		10	0 / 2	ng Star 26 /	99	1	Drilling O / 2	26 /		Drillii Holl	ig Me ow St	
	n and				· / * * *			7 25010	350	D		1200	M D		Ϋ́Υ	Aug		
DNR	Facility	Well 1	VO. W	/I Unique We	il No.	Common We	MW-3	Final	Static	Water Feet M		Surfa	ce Elev		MSL	Boreh 8.5		ameter nches
Boring State I	Locati	on	0000000 2000	N,		-	E S	1 I	at	٥	1 11	Loca	l Grid I			plicab	le)	
		NE	1/4 o	f Section	26, T_	5 N, R_	18 E	Lon		-	, 11		F	eet 🗆	N IS		Fee	E W D
Count	y	v	aukes	sha			DNR	County 68	Code	Civil			r Villag Iukwor					
San	nple								_	\vdash	I	1	I		Prope	rties		_
	& (in)	ıts	eet			ck Descriptio				l	1		e,					1
д Де	Att ered	Cour	in F			ogical Origin Major Unit	For		S	.2	E	а	ressi	art are		ity		ents
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet			gor o			USC	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
	D.E.	ш			Blin	nd drilled to	28' bgs.		-	01	-			20	11	чп	Δ.	£0
					For	complete ge	eologic											
			-1.0		des	cription, see	GP-0.											
		- 1	2.0															
			:															
			3.0															
			:															
			4.0								H							
		- 1	-5.0															
			5.0															
			6.0															
			7.0															
			8.0															
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1		- 1	-10.0															
		-						1			ı							
		-	-11.0															
			-12.0															
		tify th		information	n on thi	s form is tr												
Signati		Li C	bir	derle	lden								tal So WI 53				1	

This form is authorized by Chapters 144, 147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

State of Wisconsin
Department of Natural Resources
Boring Number MW-3

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A Rev. 5-92

Use only as an attachment to Form 4400-122.

Page _

San	ple					T	T		T	T	Soil	Prope	rties		T
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	And	oil/Rock Description I Geological Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content		Plasticity Index	P 200	RQD/ Comments
2	24 2	100	-13.0 -14.0 -15.0 -16.0 -17.0 -18.0 -20.0 -21.0 -22.0 -23.0 -24.0 -25.0 -26.0 -27.0 -28.0 -29.0 -30.0	28.0 to 30.0	SAND, black, poorly sorted, medium to very coarse grained, wet SAND, medium to very coarse grained, poorly sorted, wet, black Blind drilled to 35' bgs	SP SP			0		w				No Odor

State of Wisconsin
Department of Natural Resources
Boring Number MW-3

SOIL BORING LOG INFORMATION SUPPLEMENT Form 4400-122A Rev. 5-92

Use only as an attachment to Form 4400-122. 3 of 3 Page Sample Soil Properties Length Att. & Recovered (in) Compressive Strength Depth in Feet Soil/Rock Description Blow Counts And Geological Origin For Plasticity Index Moisture Content Well Diagram PID/FID USCS Graphic Log Each Major Unit Liquid Limit P 200 33.0 34.0 35.0 37.0 38.0 40.0 41.0 42.0 44.0 44.0 44.0 44.0 44.0 45.0 46.0 47.0 48.0

	of Wisc		ıral Re	sources	5		Emerg	o: Waste gency R water	espons	se 🔲 l	Haz. W Underg Water I	round Resour	ces				BOR 4400-1		LOG 1		Rev.	5-92
Facilit	y/Proje	ect Nar	ne				Super	fund		<u> </u>	Other 4		round 7			g Nun	nber	Borir	Page_ng Num	ber	of	
Horn	Oil C	ompai	ny		3	6 .		1-:6			JM	404								M	W-4	41. 1
Mid- Brian	Drille Ameri and	ca Dri Denni	illers s								1 M	$\frac{0}{\mathbf{M}}$	ng Star 26 / D D	99 Y Y	-	<u>1</u>	$\frac{0}{\mathbf{M}} / \frac{2}{\mathbf{D}}$	26 / D	99	Aug	ow St er	em
DNR	acility	Well	No. V	/I Unic	jue We	:II No). 	Commo		l Name MW-4	Fina	l Static	Water Feet			Surfac	ce Elev		MSL	Boreh <u>8.5</u>		ameter nches
	Locat				N,					E S	1	.at	۰	•	"	Local	Grid I		n (If ap N	plicab	le)	—— ПЕ
	_ 1/4 o	f NE	_ 1/4 c	f Secti	on	<u>26</u> ,	, T	_5 N	, R		Lo		0	71	II 			Feet 🗆			Fee	t 🗖 w
County	<i>y</i> 	•	Wauke	sha						DNK	Count 68		CIVII			•	r villag Lukwoi					
San	nple											Π	Т	Γ				Soil	Prope	rties		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet			And	Geolo	k Desc ogical C Major U	Origin I			USCS	Graphic Log	Well	Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1	14		1.0		to 4		grav 10Y	el, moi R4/6	st, pla	Y, with stic,	12	sc				0		M				No Odor
3	12 20	30 28 45 28	5.0		to 8		sorte dens grain Sand grav med loose	ium greed, loose, hard ned, mod ly CLA el, mod ium gree, 10YF	ained, ie. 6" 5 l, very oist, 10 XY, wit st, ver ained, R6/4	poorly SILT, fine 0YR6/4 th trace y fine t moder	e to ately	sc				0		М				No Odor
5	6	18 28 38 48 48	9.0	10.0	to 10		grain Grav very sorte Silty fine	beddined, we welly SA coarse ed, dry SAND	ng, ver et, 10Y AND, r grain , very d, well	4" SIL ry fine (R6/4, 4 mediun ed, poo fine to sorted	4" n to orly	SM				0		W/D				No Odor No Odor
		rtify t	7			7	7	form	is tru	e and									es, Ir	ı.c		
Signati	" (1)	di	16	nd	es C	Lel	d												es, 11 414) 76		1	

This form a suthorized by Chapters 144, 147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

State of Wisconsin
Department of Natural Resources
Boring Number MW-4

SOIL BORING LOG INFORMATION SUPPLEMENT

Form 4400-122A

Use only as an attachment to Form 4400-122.

Page ____2 of ___2

Sample Soil Properties 2 E in Feet Compressive Strength Blow Counts Soil/Rock Description Length Att. Recovered (RQD/ Comments And Geological Origin For Moisture Content Plasticity Index Well Diagram PID/FID USCS Graphic Log Each Major Unit Depth i Liquid Limit P 200 12.0 to 14.0 Silty SAND, very fine to M No Odor fine grained, well sorted, 13.0 -14.0 -15.0 loose, moist 14.0 to 16.0 SW Gravelly SAND with cobbles, D/MNo Odor dry/moist, poorly sorted, very coarse grained 17.0 -17.0 -18.0 -19.0 0 64 16.0 to 18.0 No Recovery Gravelly SAND with cobbles, ŚW 18.0 to 20.0 D/M No Odor dry/moist, poorly sorted, very coarse grained -20.0 Blind drilled to 24' bgs 22.0 22.0 23.0 10 24.0 to 26.0 Silty SAND, dry, medium SM D No Odor grained, well sorted, loose 26.0 26.0 to 28.0 11 12 40 Silty SAND, moist, medium M No Odor grained, well sorted, loose 28.0 to 30.0 Silty SAND, poorly sorted, 12 14 W No Odor 44 43 90 E_{29.0} with trace gravel, wet -30. Blind drilled to 36' bgs

	of Wisc tment o		ıral Re	sources	☐ Wastewa	icy Response iter	□ Wa	dergr	ound T esourc	es			BOR 4400-1				Rev.	5-92
Facili	ty/Proje	ect Nar	ne		☐ Superfur	ıd				ound T		ng Nu	nber	Borii	Page_ ng Nurr		of	
Hori	i Oil C	ompar	ıy							, , , , , , , , , , , , , , , , , , , ,						M	W-5	
Mid-	Ameri n and	ca Dri	llers	ame and nam	ne of crew chic			10) / :	ng Start 26 / D N	99	_1	Drillin O / Z M D	26 /	99	Drillii Holl Aug	ow St	
	Facility		No. V	/I Unique W	ell No. Co	mmon Well M	Name IW-5	Final —	Static	Water Feet N			ce Elev	Fee	t MSL	8.5	<u>0</u> i	ameter nches
State				N,			E S		at	·	· ··	Loca	l Grid I		N	oplicab		DΕ
Count		f <u>NE</u>	_ 1/4 o	f Section	26, T	5 N, R	18 E DNR C	Lon		Civil'	 lown/	ity/ o		eet 🗆	s _		Fee	t 🗆 W
		V	Vauke	sha				68	_				1ukwoi	nago				
Sar	nple		1		Seit/Deals	Donosistias								Soil	Prope	rties		
75 H	Att. d	Counts	in Fee		And Geologi Each Ma		or		S	S	E	۵	essive th	er te	-	ity		ents
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet		Each Ma	jor Omt			USC	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
	П		:		Blind	drilled to 35'	' bgs	9										
			-2.0 -3.0 -4.0													ω		
			6.0															
			-7.0 -8.0															
			9.0															
			10.0								ı					ĺ		
			11.0							ÿ								
l here	by cer	tify th	-12.0 at the	e informatio	on on this fo	orm is true												
Signati		OD.	di	Sande	1/0/		Fi	rm S	Sigm	a Env	viron	men	tal So WI 53	ervic				
				Chapters 144	, 147 and 162 violation. Fin		Complet	ion of	this r	eport is	s mand	atory.	Penalt	ies: Fo	rfeit n	ot less		

both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

State of Wisconsin Department of Natural Resources Route to: Solid Waste Thaz. Waste I Env. Response & Repair T Undergroup	■ Wastewater ■ MONITORING WELL CONSTRUCTION Form 4400-113A Rev. 4-90 and Tanks ■ Other Aboveground Tan
Facility/Project Name Local Grid Location of	Well Name
Horn Oil Company	Nft.
Facility License, Permit or Monitoring Number J M 4 0 1 Grid Origin Location Lat.	Wis. Unique Well Number DNR Well Number
Piezometer 12 Section Location of W	ft. N, ft. E. Date Well Installed $\frac{1}{m} \frac{0}{m} / \frac{2}{d} \frac{5}{d} / \frac{9}{y} \frac{9}{y}$
Distance Well Is From Waste/Source Boundary NE 1/4 CNE	Sec. 26, T. 5 N, R. 18 W. Well Installed By: (Person's Name and Firm) Mid-america Drillers
ft. Location of Well Relati	Mid-america Drillers
Is Well A Point of Enforcement Std. Application? u ☐ Upgradient d ☐ Downgradient	s 🗖 Sidegradient
A. Protective pipe, top elevation ft. MSL	1. Cap and lock?
B. Well casing, top elevation ft. MSL	2. Protective cover pipe: a. Inside diameter:
C. Land surface elevation ft. MSL	b. Length:
D. Surface seal, bottom ft. MSL or1.0 ft.	c. Material: Steel 🛛 04
10.20 Med 1	Other 🗆 🤍
12. USCS classification of soil near screen: GP	d. Additional protection?
Bedrock D	3. Surface seal: Bentonite Concrete O 01
13. Sieve analysis attached? ☐ Yes No	Other
14. Drilling method used: Rotary □ 50	4. Material between well casing and protective pipe:
Hollow Stem Auger ☑ 41 Other □	Bentonite 🖸 30
	Annular space seal Other Other
15. Drilling fluid used: Water 002 Air 01	5. Annular space seal: a. Granular Bentonite 🛛 33
Drilling Mud □03 None ☑ 99	b. Lbs/gal mud weight. Bentonite-sand slurry 35
16. Drilling additives used? ☐ Yes ☑ No	c. Lbs/gal mud weight Bentonite slurry 31 d. % Bentonite Bentonite-cement grout 50
Describe	eFt³ volume added for any of the above f. How installed: Tremie □ 01
17. Source of water (attach analysis):	Tremie pumped 02
	Gravity 🖸 08
	6. Bentonite seal: a. Bentonite granules 33
E. Bentonite seal, top ft. MSL or 1.0 ft.	b. □ 1/4 in. ■3/8 in. □ 1/2 in. Bentonite pellets □ 32
E Fine and ton A MSI on 1(0, 4)	c. Other
F. Fine sand, top ft. MSL or _ 16.0 ft.	a. Red Flint #45
G. Filter pack, top ft. MSL or18.0 ft.	b. Volume added ft ³
	8. Filter pack material: Manufacturer, product name & mesh size
H. Screen joint, top ft. MSL or20.0 ft.	a. Red Flint #30 b. Volume added ft³
I. Well bottom ft. MSL or _ 35.0 ft.	9. Well casing: Flush threaded PVC schedule 40 🔼 23 Flush threaded PVC schedule 80 🗖 24
J. Filter pack, bottom ft. MSL or35.0 ft.	Other 🗖 💹
	10. Screen material: PVC
K. Borehole, bottom ft. MSL or35.0 ft.	a. Screen type: Factory cut ☑ 11 Continuous slot □ 01
L. Borehole, diameter _ 8.50 in.	Other 🗖 🚉
M. O.D. well casing	b. Manufacturer c. Slot size: 0.010 in.
N. I.D. well casing 2.07 in.	d. Slotted length: 15.0 ft. 11. Backfill material (below filter pack): None 14
haraby cartity that the intermetion on this term is true and according	Other 🗆
hereby certify that the information on this form is true and corr	
Signature Sigma Firm Sigma	Environmental Services, Inc.

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs 144,147 & 160, Wis Stats, and ch NR 141, Wis Ad Code. In accordance with ch 144, Wis Stats, failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch 147, Wis Stats, failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

	id Waste DHaz. Waste I	□ Wastewater □ and Tanks □ Other ⊠ Abo	MONITORING WELL CONSTRUCTION Form 4400-113A Rev. 4-9	
Facility/Project Name	Local Grid Location of	Well	Well Name	_
Horn Oil Company	n.		MW-2	
Facility License, Permit or Monitoring Number J M 4 0 3	Grid Origin Location Lat.		Wis Unique Well Number DNR Well Numb	er
Type of Well Water Table Observation Well 11 Piezometer 112	St. Plane	ft. N, ft.	Date Well Installed $\frac{1}{m} \frac{0}{m} / \frac{2}{d} \frac{6}{d} / \frac{9}{y} \frac{9}{y}$	**
Distance Well Is From Waste/Source Boundary	Section Location of Wa	aste/Source	Well Installed By: (Person's Name and Firm)	_
ft.	NE 1/4 of NE 1/4 of 3	Sec. <u>26</u> , T. <u>5</u> N, R. <u>18</u> V	Mid-america Drillers	
Is Well A Point of Enforcement Std. Application? Yes No	Location of Well Relat u Upgradient d Downgradient	s Sidegradient	Brian and Dennis	
A. Protective pipe, top elevation	t. MSL	1. Cap and lo	ck? ■ Yes ■ No	-
	t. MSL	2. Protective a. Inside dia	• •	a.
C. Land surface elevation	t. MSL	b. Length:	1.0 ft	
		c. Material:		4
D. Surface seal, bottom ft. MSL or1	LU IL		Other 🗖 🖔	
12. USCS classification of soil near screen: GP GM GC GW SW SS SM SS SC ML ML MH GL GC	SP CH		al protection?	lo
Bedrock		3. Surface sea	d: Bentonite 30	
13. Sieve analysis attached? Yes	√o 		Concrete 1 0]	
14. Drilling method used: Rotary □ 5	1 1881	4 Meterial be	etween well casing and protective pipe:	<u></u>
Hollow Stem Auger 🖾 4		4. Waterial of	Bentonite X 30	0
Other 🗖			Annular space seal Other	*
15. Drilling fluid used: Water □02 Air □ 0	1	5. Annular sp	ace seal: a. Granular Bentonite 🛛 33	₩ 3
Drilling Mud □03 None 🛛 9	9	bLbs	s/gal mud weightBentonite-sand slurry 🚨 35	5
16. Drilling additives used? ☐ Yes ►N			/gal mud weight Bentonite slurry 🗖 31	
10. Drining additives used? Li Tes MIN	° I 📓	d% B	entonite Bentonite-cement grout 🗖 50)
Describe		e	Ft ³ volume added for any of the above	
17. Source of water (attach analysis):		f. How ins	-	
, , , ,	i 🕷		Tremie pumped	
	<u></u> J	6. Bentonite s	•	
E Doutonite and ton 9 MCI 1		IXXXI	eal: a. Bentonite granules ☐ 33 1. 【23/8 in. ☐ 1/2 in. Bentonite pellets ☐ 32	
E. Bentonite seal, top ft. MSL or1	·o_ n.	C.	Other 🗆	- 207 200
F. Fine sand, top ft. MSL or ft.	.0 ft.	7. Fine sand n	naterial: Manufacturer, product name & mesh siz	ze
		a. Red Flin	t #45	
G. Filter pack, top ft. MSL or18	. <u>o</u> tr	b. Volume	added ft ³ material: Manufacturer, product name & mesh si	·
H. Screen joint, top ft. MSL or _ 20	.o ft	a. Red Flin	The same state of the same sta	ize
		b. Volume 9. Well casing	added ft³	æ 2
I. Well bottom ft. MSL or35). Wen casing	Flush threaded PVC schedule 80 24	
J. Filter pack, bottom ft. MSL or _ 35	0 ft.	10. Screen mate	Other 🗖 🧾	2 2 2
K. Borehole, bottom ft. MSL or35_	.0 ft.	a. Screen ty	rpe: Factory cut 🛛 11	
L. Borehole, diameter _ <u>8.50</u> in.			Continuous slot 01 Other 0	
M. O.D. well casing		b. Manufac c. Slot size:		
		d. Slotted le	ength: $\underline{15.0}$ ft.	
N. I.D. well casing $\underline{2.07}$ in.		11. Backiiii ma	terial (below filter pack): None 🚨 14	X S
nereby certify that the information on this I	orm is true and cori	ect to the best of my kn		-
Signature	Firm Sigma	Environmental Compa		-

Signature

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs 144,147 & 160, Wis Stats, and ch NR 141, Wis Ad Code. In accordance with ch 144, Wis Stats, failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch 147, Wis Stats, failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

	d Waste □Haz. Waste & Repair □ Undergro		Form 4400-11	NG WELL CONSTRUCTION 13A Rev. 4-90
Facility/Project Name	Local Grid Location of	Well	Well Name	
Horn Oil Company	ft. 🖁	N. Sft.	B €	MW-3
Facility License, Permit or Monitoring Number	Grid Origin Location Lat.	Long	Wis. Unique W	Vell Number DNR Well Number
Type of Well Water Table Observation Well № 11 Piezometer □ 12	Castian I section of W			talled $\frac{1}{m} \frac{0}{m} / \frac{2}{d} \frac{6}{d} / \frac{9}{v} \frac{9}{v}$
Distance Well Is From Waste/Source Boundary ft.	<u>NE</u> 1/4 of <u>NE</u> 1/4 of	Sec. <u>26</u> , T. <u>5</u> N, R. <u>1</u>	8 Well Installed Mid-americ	By: (Person's Name and Firm)
Is Well A Point of Enforcement Std. Application? — Yes — No	Location of Well Relat u Upgradient d Downgradient	s Sidegradient	Brian and l	
A. Protective pipe, top elevation f	t. MSL	1. Cap	and lock?	🛛 Yes 🔲 No
B. Well casing, top elevation	n. MSL	1111/	ective cover pipe: ide diameter:	_ <u>10.0</u> 0 in.
C. Land surface elevation	t. MSL	b. Lei		
D. Surface seal, bottom ft. MSL or	.0 n. ()	c. Ma	terial:	Steel 🛛 04 Other 🗖
12. USCS classification of soil near screen: GP GM GC GW SW SS S		d. Ad	ditional protection? yes, describe:	☐ Yes ☐ No
SM SC ML MMH CL C		3. Surfa		Bentonite 30 Concrete 01
13. Sieve analysis attached? Yes	lo 🐰	 		Other 🗖 🧱
14. Drilling method used: Rotary ☐ 5 Hollow Stem Auger 4		4. Mate	rial between well casing	g and protective pipe: Bentonite 2 30
Other 🗖				Annular space seal Other O
15. Drilling fluid used: Water 102 Air 10	1 200	AAAA	lar space seal:	a. Granular Bentonite 🛛 33
Drilling Mud □03 None 🛛 9	' 📓	m		Bentonite-sand slurry 35
16. Drilling additives used? ☐ Yes ☑ N	o			Bentonite slurry 31 entonite-cement grout 50
Describe		e f. Ho	Ft³ volume a w installed:	added for any of the above Tremie
17. Source of water (attach analysis):				Tremie pumped 02 Gravity 08
		6. Bento	nite seal:	a. Bentonite granules 33
E. Bentonite seal, top ft. MSL or _ 1.	0_ ft.	b. 🗆		/2 in. Bentonite pellets ☐ 32 Other ☐
F. Fine sand, top ft. MSL or16.	<u>0</u> ft.			turer, product name & mesh size
G. Filter pack, top ft. MSL or _ 18.	0 ft.	b. Vo	olume added	
H. Screen joint, top ft. MSL or 20.	o n	1:::1	pack material: Manufact Flint #30	cturer, product name & mesh size
I. Well bottom ft. MSL or35.			lume added	ft³ aded PVC schedule 40 🔯 23
			-	nded PVC schedule 80 🗖 24
J. Filter pack, bottom ft. MSL or35.	0 it.	10. Screen	n material: PVC	Other 🗖
K. Borehole, bottom ft. MSL or _ 35.	0_ ft.	a. Scr	reen type:	Factory cut 🔼 11 Continuous slot 🗖 01
L. Borehole, diameter _ 8.50 in.			unufo atura-	Other 🗆 🎂
M. O.D. well casing <u>2.10</u> in.		c. Slo	mufacturer t size: tted length:	0. 010 _in.
N. I.D. well casing		`	ill material (below filter	
hereby certify that the information on this f	orm is true and con	ect to the pest of n	ny knowleage.	
Signature A 1 1 2 1 1 1	Firm Sigma	Environmental Sei	vices, Inc.	

220 E. Ryan Road, Oak Creek, WI 53154 (414) 768-7144

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	Solid Waste □Haz. Waste ase & Repair □ Undergro		Form	NITORING WELL COM 1 4400-113A		ΓΙΟΝ . 4-90
Facility/Project Name	Local Grid Location o	f Well	Well	Name		
Horn Oil Company	ft. 🗆	N. S	_ft. 🖁 E.	MW-4		
Facility License, Permit or Monitoring Number J M 4 0 4	Grid Origin Location Lat.		Wis.	Unique Well Number DN	R Well No	umber
Type of Well Water Table Observation Well Diezometer	12 Section Legation of W	loot of Course		1 0 / 2	2 6 / 9 -	
Distance Well Is From Waste/Source Boundary	NE 1/4 of NE 1/4 of	Sec. 26 . T. 5 N.	R. 18 W. Well	Installed By: (Person's Na		
Is Well A Point of Enforcement Std. Application		tive to Waste/Sour	ient	id-america Drillers		_
□ Yes □ N		n 🗖 Not Know	wn Br	ian and Dennis		_
A. Protective pipe, top elevation	ft. MSL		Cap and lock?		XIYes 🗖	No
B. Well casing, top elevation	ft. MSL	1011/	Protective cover pip . Inside diameter:	pe:	10.0	00 in.
C. Land surface elevation	ft. MSL		o. Length:		1.0 Steel 🔯	0_ ft.
D. Surface seal, bottom ft. MSL or _	_ <u>1.0</u> ft.	i X	. Material:		Other \square	
12. USCS classification of soil near screen: GP GM GC GW SW C	I SP 🗆		I. Additional protections. If yes, describe:	ction?	Yes 🗆	No
Bedrock □	CH D	3.8	Surface seal:	Co	ntonite oncrete	30 01
	No No	X	Matarial hatrycan v	vall assiss and materials		
14. Drilling method used: Rotary Hollow Stem Auger	XI 41	4.1	Materiai between v		ntonite 🛚	30
Other					Other 🔲	**
15. Drilling fluid used: Water □02 Air Drilling Mud □03 None	1 500			a. Granular Ben d weight. Bentonite-sand		33 35
Ĭ	1 🐰			d weight Bentonite:		31
16. Drilling additives used? Yes	Ø No Ø		% Bentonite	Bentonite-cement	grout 🗖	50
Describe		e f.	Ft ³ How installed:	volume added for any of Tr	the above remie	01
17. Source of water (attach analysis):				Tremie pu G	mped bravity	02 08
		6. H	Bentonite seal:	a. Bentonite gra	•	33
E. Bentonite seal, top ft. MSL or _	_ <u>1</u> .0_ ft.	b		in. 1/2 in. Bentonite		32
F. Fine sand, top ft. MSL or _	_17.0_ ft.	W /	Fine sand material: Red Flint #45	Manufacturer, product na		h size
G. Filter pack, top ft. MSL or _	_19.0 ft.	b.	. Volume added _	ft³		*******
H. Screen joint, top ft. MSL or _	21.0 ft.	11	Filter pack material Red Flint #30	: Manufacturer, product n	ame & me	sh size
I. Well bottom ft. MSL or		= 9.1.2∕	Volume added Well casing: F	ft³ lush threaded PVC sched	ule 40 🔼	23
J. Filter pack, bottom ft. MSL or _			F	lush threaded PVC sched	ule 80 🔲 Other 🚨	24
J. Filter pack, bottom	_30.v_ n.	<i>///</i>	Screen material:	PVC		
K. Borehole, bottom ft. MSL or _	36.0 ft.	a.	Screen type:	Facto Continuo	ry cut 🛛 us slot 🔲	11 01
L. Borehole, diameter <u>8.50</u> in.			Manufaataaa		Other	¥\$
M. O.D. well casing		b. c. d.	Manufacturer Slot size: Slotted length:		0.01 <u>0</u> _15.0	
N. I.D. well casing		`11. E	Backfill material (b	• •	_	14
rnereby certify that the information on th			.	ge.		
Signature 11/2/	Firm Sigma	Environmenta	Services Inc			

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs 144,147 & 160, Wis Stats, and ch NR 141, Wis Ad Code. In accordance with ch 144, Wis Stats, failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch 147, Wis Stats, failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

State of Wisconsin Department of Natural Resources Route to: Solid Waste □ Haz. W Env. Response & Repair □ Under	Waste Wastewater MONITORING WELL CONSTRUCTION Form 4400-113A Rev. 4-90 erground Tanks Other Aboveground Tan
Facility/Project Name Local Grid Locat	ion of Well Name
Horn Oil Company Facility License, Permit or Monitoring Number Grid Origin Loca	··· 🖸 S
Lat	Long or
Piezometer 12 Section Location	of Waste/Source R. E. Date Well Installed 1 0 2 6 9 9 0
Distance Well Is From Waste/Source Boundary NE 1/4 of NE 1	/4 of Sec. 26 T. 5 N. R. 18 Well Installed By: (Person's Name and Firm)
Location of Weil	Relative to Waste/Source
	dient n □ Not Known Brian and Dennis
A. Protective pipe, top elevation ft. MSL	
B. Well casing, top elevation ft. MSL	2. Protective cover pipe: a. Inside diameter: 10.00 in.
C. Land surface elevation ft. MSL	b. Length: c. Material: b. Length: 5teel 04
D. Surface seal, bottom ft. MSL or 1.0 ft.	Other 🗆 💮
12. USCS classification of soil near screen:	d. Additional protection?
GP	3. Surface seal: Bentonite 30
Bedrock □ 13. Sieve analysis attached? □ Yes 🔊 No	Concrete M 01
14. Drilling method used: Rotary 50	Other 4. Material between well casing and protective pipe:
Hollow Stem Auger 🛮 41	Bentonite 23 30
Other 🗖 🌉	Annular space seal Other Other
15. Drilling fluid used: Water □02 Air □ 01	5. Annular space seal: a. Granular Bentonite 🛛 33
Drilling Mud □03 None ■ 99	bLbs/gal mud weightBentonite-sand slurry 35
16. Drilling additives used? ☐ Yes ☑No	c. Lbs/gal mud weight Bentonite slurry 31 d. % Bentonite Bentonite-cement grout 50
Describe	e. Ft³ volume added for any of the above f. How installed: Tremie □ 01
17. Source of water (attach analysis):	f. How installed: Tremie
	Gravity 🖸 08
	6. Bentonite seal: a. Bentonite granules 33 b. 1/4 in. 3/8 in. 1/2 in. Bentonite pellets 32
E. Bentonite seal, top ft. MSL or 1.0 ft.	b. 1/4 in. 33/8 in. 1/2 in. Bentonite pellets 32 c. Other 1
F. Fine sand, top ft. MSL or16.0 ft.	7. Fine sand material: Manufacturer, product name & mesh size
G. Filter pack, top ft. MSL or _ 18.0 ft.	a. Red Flint #45 b. Volume added ft³
o. The pack, op	8. Filter pack material: Manufacturer, product name & mesh size
H. Screen joint, top ft. MSL or _ 20.0 ft.	a. Red Flint #30 b. Volume added ft³
I. Well bottom ft. MSL or35.0_ ft.	9. Well casing: Flush threaded PVC schedule 40 \(\textbf{\textit{Q}} \) 23 Flush threaded PVC schedule 80 \(\textbf{\textit{Q}} \) 24
J. Filter pack, bottom ft. MSL or35.0 ft.	Other □
K. Borehole, bottom ft. MSL or 35.0 ft.	a. Screen type: Factory cut ☑ 11
L. Borehole, diameter 8.50 in.	Continuous slot Other
12. Doteliote, diameter _ 9.50 m.	b. Manufacturer
M. O.D. well casing	c. Slot size: 0.010 in. d. Slotted length: 15.0 ft.
N. I.D. well casing	11. Backfill material (below filter pack): None ☑ 14 Other □
nereby certify that the information on this form is true and	
Signature Firm Signature	gma Environmental Services, Inc.

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs 144,147 & 160, Wis Stats, and ch NR 141, Wis Ad Code. In accordance with ch 144, Wis Stats, failure to file this form may result in a forfeiture of not less than \$10, nor more than \$5000 for each day of violation. In accordance with ch 147, Wis Stats, failure to file this form may result in a forfeiture of not more than \$10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

Spectment of Natural Resources

MONITORING WELL DEVELOPMENT Form 4400-113B Rev. 7-98

Notice to. Watersteen Wastewater	Waste Management
Remediation/Redevelopment	
acility/Project Name	Jaukesha Mu)-1
Facility License, Permit or Monitoring Number County Code	Wis. Unique Well Number DNR Well ID Number
proj. + 4050	· -
1. Can this well be purged dry?	Before Development After Development 11. Depth to Water
Well development method	(from top of
surged with bailer and bailed 😿 41	well casing)
surged with bailer and pumped	"
surged with block and bailed 42	Date : 11,08,1999 11,08,000
surged with block and pumped	Date b $\frac{1}{m} \frac{1}{m} \frac{1}{d} \frac{1}{d} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{m} \frac{1}{m} \frac{1}{d} \frac{1}{d} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y}$
surged with block, bailed and pumped \Box 70	i e e e e e e e e e e e e e e e e e e e
compressed air	Time c: p.m: p.m.
bailed only	
pumped only	12. Sediment in well
pumped slowly	bottom opaque to
Other	13. Water clarity Clear 10 Clear 120
· · · · · · · · · · · · · · · · · · ·	Turbid 15 Shaph Turbid 25
Time spent developing well min.	(Describe) (Describe)
Depth of well (from top of well casisng) 3480 ft.	
Inside diameter of well	
Volume of water in filter pack and well casing	
Nolume of water removed from well 550 gal.	Fill in if drilling fluids were used and well is at solid waste facility:
Volume of water added (if any) Now gal.	14. Total suspended mg/l mg/l solids
Source of water added None	15. COD mg/l mg/l
,	
	16. Well developed by: Name (first, last) and Firm
J. Analysis performed on water added? Yes No	First Name: David Last Name: Dailey
(If yes, attach results)	· •
Additional comments on development:	Firm: Sigma Env.
Auditional Comments on development.	
!	
i	
ş	
	•
Address of Facility Contact (Ourse //Dones //D	
me and Address of Facility Contact/Owner/Responsible Party Last	I hereby certify that the above information is true and correct to the best
be:Name:	of my knowledge.
sility/Firm: Siama Env.	Signature: David Dailen
220 E. Ryan Rd	Print Name: David Dailey
y/State/Zip: Oak Geek WI	Firm: Sigma Env.

partment of Natural Resources

MONITORING WELL DEVELOPMENT Form 4400-113B Rev. 7-98

Marie m. Waterstreet Wastewater	Waste Management
Remediation/Redevelopment	Other
cility/Project Name \ \ County Name	Well Name
HOIN OIL	Daukesha MW-2
Facility License, Permit or Monitoring Number County Code	Wis. Unique Well Number DNR Well ID Number
xoj. + 4050	
1. Can this well be purged dry?	Before Development After Development
Wall development mathed	11. Depth to Water (from top of
Well development method surged with bailer and bailed y 4 1	(from top of a 00 96 ft. 2135 ft. well easing)
	well cashig)
	11 00 1000 11 001
	Date b $\frac{1}{m} \frac{1}{m} \frac{1}{d} \frac{1}{d} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{m} \frac{1}{m} \frac{1}{d} \frac{1}{d} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y}$
surged with block, bailed and pumped	mm a a y y y y mm d d y y y
	Time c. 12:50 [2.m.] 2:50 [2.m.
bailed only	Time a rate war. A sou war.
pumped only	12. Sediment in well
pumped slowly	1 hattam
Other 🗆	opawe10
	13. Water clarity Clear [] 10 Clear [] 20 Turbid [] 15 slight Turbid [] 25
Time spent developing well	(Describe) (Describe)
	(Describe)
Depth of well (from top of well casising) _34.75ft.	
•	
Inside diameter of well	
. Volume of water in filter pack and well	
cusing	No.
	Fill in if drilling fluids were used and well is at solid waste facility:
. Volume of water removed from well _500 gal.	
. A1	14. Total suspended mg/l mg/l
Volume of water added (if any) No Me_gal.	solids
Mona	
Source of water addedNONR_	15. COD mg/l mg/l
	16. Well developed by: Name (first, last) and Firm
O'Analysis performed on water added? Yes No	First Name: David Last Name: Dailey
(If yes, attach results)	
Additional comments on development:	Fim: Sigma Env.
Auditorial confinents on development.	
t.	·
i .	
· ·	
I STATE OF THE PROPERTY OF THE	
me and Address of Facility Contact/Owner/Responsible Party Last	I hereby certify that the above information is true and correct to the best
be:Name:	of my knowledge.
C - F	Da : I D. I
Ellity/Firm: DIAMA ENV	Signature: Java Jauley
22 5 0 0	7 17 1
et ddo E. Ryan Ka	Print Name: David Davley
Och Conk 1127	C: \(\sigma_{}\)
V/State/Zip: Oak Geell W]	Firm: Sigma ENV.
	3

Route to: Watershed/Wastewater	Waste Management
Remediation/Redevelopment	Other
cility/Project Name HOW OIL County Name	laukesha MW-3
cility License, Permit or Monitoring Number County Code	Wis. Unique Well Number DNR Well ID Number
.Can this well be purged dry?	Before Development After Development
Well development method surged with bailer and bailed	11. Depth to Water (from top of well casing) Date b. \frac{1}{m} \frac{\lambda}{\lambda} \lamb
Depth of well (from top of well casisng) 34.65 ft.	
Volume of water in filter pack and well casing	Fill in if drilling fluids were used and well is at solid waste facility: 14. Total suspended mg/l mg/l
Folume of water added (if any) None gal. Source of water added	15. COD mg/l mg/l 16. Well developed by: Name (first, last) and Firm
Analysis performed on water added? Yes No (If yes, attach results) Additional comments on development:	First Name: David Last Name: Dailey Firm: Sigma Env.
t: 220 E. Ryan Rd v/State/Zip: Oak Creek WI	I hereby certify that the above information is true and correct to the best of my knowledge. Signature: David Dailey Firm: Signature Env.

Route to: Watershed/Wastewater	Waste Management
Remediation/Redevelopment	Other
cility/Project Name \ \ County Name	Well Name
Horn oil	aukesha MW-4
Facility License, Permit or Monitoring Number County Code	Wis. Unique Well Number DNR Well ID Number
roj. \$ 4050	
V	
1. Can this well be purged dry?	Before Development After Development
	11. Depth to Water (from top of a 29.93 ft. ORY ft.
Well development method	
surged with bailer and bailed 4 1	well casing)
surged with bailer and pumped 6 1 surged with block and bailed 4 2	11 00 1000 11 00 1000
	Date b $\frac{1}{m} \frac{1}{m} \frac{1}{d} \frac{1}{d} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{m} \frac{1}{m} \frac{1}{d} \frac{1}{d} \frac{1}{y} \frac{1}{y} \frac{1}{y} \frac{1}{y}$
	Time c. 10:45 m a.m. 12:45 m p.m.
bailed only	rinic c. 1 - 1 pint. 1 - 1 pint.
pumped only	12. Sediment in well
pumped slowly	hattam
Other	13. Water clarity Clear 10 Clear 20
	Turbid 15 Skart Turbid 1 25
Time spent developing well	(Describe) (Describe)
Depth of well (from top of well casisng) 34.75 ft.	
a	
Inside diameter of well	
. Volume of water in filter pack and well	
casingZ.36 gai.	
. Volume of water removed from well	Fill in if drilling fluids were used and well is at solid waste facility:
Volume of water removed from well	
Volume of water added (if any) No me gal.	14. Total suspended mg/l mg/l
\ 1	solids
Source of water added NONE	15. COD mg/l mg/l
, source of water asset	
	16. Well developed by: Name (first, last) and Firm
0. Analysis performed on water added? Yes No	First Name: David Last Name: Dailey
(If yes, attach results)	
	Firm: Sigma Env.
Additional comments on development: R . 1 \	Linear wilded 45 his betwee boiling
Lailed dry 3	times; waited 45 min before bailing each time.
1st 2gals. 2nd 1/2 gals.	_·
2.1 1/2 ads.	10 min at the well each time
	-for all to a such time
3rd Igal.	for a total of 30 min.
	•
me and Address of Facility Contact/Owner/Responsible Party	I hereby certify that the above information is true and correct to the best
T Last	of my knowledge.
Name:	
offity/Firm: Siama Env.	Signature: Varia Vailen
cility/Firm:	
= 220 E. Kvan Rd	Print Name: David Dailey
(C) \(\lambda \) \(\lambda \	
rystate/Zip: <u>Oals Geell W.</u>	Firm: Sigma ENV.
	J

Route to: Watershed/Wastewater	Waste Management
Remediation/Redevelopment	Other
acility/Project Name County Name	Well Name boy 1
HOW OIL M	Daukesha 1 MW-5
Facility License, Permit or Monitoring Number County Code	Wis. Unique Well Number DNR Well ID Number
proj. # 4050	
1. Can this well be purged dry?	Before Development After Development
t. Can and we parked up.	T. D. ref. on Wilson
Well development method	(from top of $\frac{18.75}{1.00}$ ft. $\frac{16.95}{1.00}$ ft.
surged with bailer and bailed 1 4 1	well casing)
surged with bailer and pumped 61	
surged with block and bailed 4 2	Date ; 11,08,1999 11,08,1990
surged with block and pumped	Date b. $\frac{1}{m} \frac{1}{m} \frac{1}{d} \frac{1}{d} \frac{1}{y} \frac{1}$
surged with block, bailed and pumped 70	
compressed air	Time c. 1.00 p.m. 3.00 p.m.
bailed only	-5 ,
pumped only	12. Sediment in well
pumped slowly	bottom spagne to
Other 🗆 🎬	13. Water clarity Clear 10 Clear 20
· · · · · · · · · · · · · · · · · · ·	Turbid 15 Slight Turbid 125
Time spent developing well	(Describe) (Describe)
Death of well (from top of well easising) = 31,35 ft.	
Depth of well (from top of well casisng) 2 57 ft.	
Inside diameter of well	
i. Volume of water in filter pack and well	
casing 19.17 gal.	
	Fill in if drilling fluids were used and well is at solid waste facility:
Volume of water removed from well55.0 gal.	
	14. Total suspended mg/l mg/l
Volume of water added (if any) No No gai.	solids
None	
Source of water addedNONE	15. COD mg/l mg/l
; ;	16 Wall developed by Nov. (5-4 ball) at Fig.
0. Analysis performed on water added? Yes No	16. Well developed by: Name (first, last) and Firm
0. Analysis performed on water added? Yes No (If yes, attach results)	First Name: David Last Name: Dailey
(it yes, and items)	Fim: Siama Enu
/ Additional comments on development:	Time Signer Dite.
7. Additional comments on development: Considerable a	mount of Sediment backed from
this well.	
	i.
VIII will can almost he miscool	I dry, but will not go completly dry
I This well can almost be pringer	T and I soul man do a service it
j	•
ame and Address of Facility Contact/Owner/Responsible Party	Thereby conside that the above information is tope and connect to the best
st Last	I hereby certify that the above information is true and correct to the best of my knowledge.
ne: Name:	Constitution of the consti
offity/Firm Sigma Env	Signature: Varid Vailer
	7
be: 220 E. Ryan Rd	Print Name: David Dailey
y/State/Zip: Oak Geek WI	Firm: Sigma ENV.